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EDITORIAL NOTES.

At the End of Six Months.

It has been a notable fact that, the longer the coal stoppage has lasted, the weaker has become the position of the Miners' Federation, until to-day the men who have been responsible for its direction are now the objects of ridicule, and have lost entirely the respect of the major part of the nation, and the obedience of a large section of the miners themselves. We undertake to say that one thing that has worried these leaders behind closed doors, and has no doubt sadly disturbed other hot heads in the labour world, has been the cool manner in which the country has taken this protracted stoppage in its basic industry—now only three or four days short of half-a-year's duration, and that, although throughout industries have been suffering enormous losses, they are willing to go on doing so rather than have a settlement based on unrealities, which would only lead to a future of uncertainty and further disastrous disturbances. No nation can expect to be continuously prosperous in such circumstances. It is also fair to believe that the Government have learnt a lesson. Subsidies and intervention where such men as Cook, Smith, and their like have to be dealt with are not an atom of good. They only tend to supply excuses for a prolongation of trouble. At the same time, it must be acknowledged that in this instance the longer the stoppage, the weaker has become the position of the Miners' Federation—weak as it was, through the ignoring of economic facts, at the beginning of the dispute. With the increasing feebleness brought about by the strange mentality of the men who had worked their way (by what means is a mystery) into leadership, the only possible end to the stoppage is developing—by the miners entering into agreements direct with their employers, until now we see something like a quarter of a million of them at work again, and with fresh breaches being made in districts other than those where work is approaching almost normal, and in which the perambulations of the ridiculous "Council of War" and much speech-making have had no effect. The number of men at work to-day is greater than on the day when what has become known as "Cook's Circus" set out on tour, with a little break in it for an interview with the General Council of the Trade Union Congress, to ask them to impose an embargo on imported coal and, in aid of the miners, a levy on other trade unions. The General Council of the "T.U.C.," we fancy, are as much "fed up" with the miners' hare-brained leaders as are other people; and all they would promise was to refer the request for an embargo to the unions concerned, and to leave the question of a levy to those unions who are now rich enough to indulge in such generosity. The unlikelihood of anything happening as a result of this interview is well reflected by the plain speaking that took place at the recent conference of the Labour Party. What the trade union leaders of this country have before them, as a result of the doings of this year, is a mountain of wreckage, which will take long to clear away; but, among it, there are lessons which, it is hoped and believed, will have an abiding influence.

Mr. John Cowen on Industrial Problems.

The developments and problems with which the country and its industries are confronted at the present time constitute a fascinating study, and an imperative one for everybody who has our future interests at heart. They are varied, complex, and far-reaching. These characteristics are vividly illustrated by the broad consideration which Mr. John E. Cowen gave to them in the Presidential Address which he delivered yesterday to the British Commercial Gas Association at their annual meeting and conference. Located in the world-famed Tyneside industrial area, and the head of the directorate of the Newcastle-upon-Tyne and Gateshead Gas Company, which supply that area, he is in direct contact with, and in favourable position to view, the many problems which affect us nationally and industrially.

In the first place, the President shows how, through the power which extremists in trade unions have succeeded in acquiring, by intrigue and sowing their subversive doctrines on the lower order of intelligence, our industrial system has become riven, disturbed, and chaotic; and misconception has grown as to all labour demand being attainable by force, despite the barrier of economic conditions. That is one state of affairs which has to be dealt with, and supplanted by the knowledge that the maximum universal good is only realizable by all elements in the industrial system working together with one objective in view. Industrial workers have also to understand that industries are so interrelated that what affects one affects all in greater or less degree—that one trade union cannot produce an interruption in the industry its members serve, without seriously affecting the members of other unions. That is one of the lessons of the present struggle in the coal industry; and union leaders whose business it is to look after the interests of the workers in other industries have had the biggest shock of their lives, owing to the ramifications of the dispute in reducing almost generally the scope of employment. Industrial disputes affect the gas industry in the same way as other industries. When a dispute lessens employment, it lowers the demand for gas and other products of coal carbonization from the industry in which the trouble is chiefly centred, and it reduces the gas-purchasing power of the people employed in it. But in the case of a coal dispute, the gas industry is affected differently from any other industry, due to the condition that, as the availability of coal becomes less, the demand for gas and coke becomes more pressing; but the counterbalancing influences are that, through the higher cost of raw materials, the prices of gas and coke have to ascend,, and there is the loss of custom from the reduction or closing-down of the activities of other industries.

Mr. Cowen points to the illusion engendered by the war—that a new heaven and new earth were imminent; and this illusion has continued to exist. But we do not believe it prevails to any large degree; if we admitted that it did, we should have to accompany it with the belief that a majority of our industrial workers possess intelligence of much lower degree than we know to be the fact. It is part of the business of the agitators, the Communists, and such-like sedulously to create discontent, and then upon it to build up hopes, and inspire impossible ideals; and, when the ground is prepared, to advocate forcible

methods of seeking attainment. While these processes go on, there will be trouble. But we do not believe that such men have succeeded in upsetting the balance of judgment of the majority of the industrial workers. We have, however, the singular spectacle that, though possessing the smallest following, in some unions the extremists have the dominant power; and that even those who repudiate their doctrines and teachings comply with their commands. It is not disillusionment that is required; it is that the intelligent men of the trade unions should pull themselves together, exercise their power, and insist that their organizations shall be brought back to proper state, be again constitutionally governed, and be limited to their legitimate functions. In one place, Mr. Cowen speaks of the need for disillusionment from carefully fomented deceptions and false ideals; but he recognizes immediately after that the active forces which have to be dealt with are the men who are trying to undermine all that is constitutional, to create discord in our social system, and to work destruction, with the one view of transferring power from sanity to insanity. There we have the root of the matter; and it is at the root that work has to be done. The only people who can effectively deal with the usurpers of power and the discord-creating elements in the lives of trade unions and the nation are the members of those organizations who have kept their mental faculties free from the damaging influences of the teachings of these men. With this view Mr. Cowen agrees. He says: "In the general strike, as in the coal dispute, we have "seen such confusion of thought, and such an ignoring "of plain economic facts by trade union leaders, that one "is driven to the conclusion that at least a section in "control have entirely lost sight of the functions of trade "unions, and are subordinating the real interests of their "members to purely political objects. It is for the trade "unions in the first place to purge themselves of such "leaders; and it is for the employers to encourage and "assist in every way they can the great body of loyal "workers (who, after all, form the majority of the trade "unionists of the country) to put their house in order." At the same time, they should discard such vicious policies as the restriction of output, which America has proved is detrimental collectively and individually, while greater output per man is the way to success, and to the ability to pay more. Every industry is a system composed of several parts; and unless all parts work harmoniously and co-operatively with the others, there cannot be the maximum success.

The second phase in the industrial position with which the President dealt is one of technical and financial importance to industry. It raises the question as to whether industry generally has a full appreciation of the advantage of applying proved developments to raise the economic level of production. We have this true dictum from Mr. Cowen: "Fuel for heat is more important than fuel "for power." How many of the technical men in the industries of the country fully realize that? It requires not only universal but deeper consideration. No one wants to derogate the position of power; that would be folly. But what has far from complete recognition in industry to-day is that the primary cost of fuel is not necessarily representative of the ultimate value in work of any kind. Mr. Cowen gives examples of this in connection with the application of gas to industry, and shows that, in relation to production, costs have been materially reduced by the application of gas, even though the cost of the potential heat may be greater than that in a less handy and governable form of fuel. He also submits that standardization pays, and he urges that the gas industry would be well to study carefully this matter. Most satisfactory results have been obtained from the application of the principle in Newcastle with regard to gas cookers and fires. The manufacturers of such appliances have not been oblivious to the importance of this; and they have done much in standardization which has been very valuable in these days of hiring and steady growth of free maintenance. With the latter, every possible economy must be studied; and to this, standardization is a contributory item of no mean value.

The third phase in the industrial position to which the President referred is that, with the changes effected by time in the industrial position, there must be appropriate changes in enactments and control. The gas industry stands out prominently as an illustration of this. For some years past, there has been external and internal mutation; but, excepting the Gas Regulation Act, many legislative controls still exist which operate as clogs to the free movement called for by the new conditions which assail, and which must be met by, the industry. It is impossible to render the best service with statutory gyves impeding movement. There is no wish to divest gas undertakings of statutory control, so long as it is of a nature that is appropriate to the new circumstances of public service and requirement, intensified competition, and heavier costs. The President refers to some of the directions in which greater latitude is now desirable—such as being placed in the position to raise capital on more reasonable terms. At present, through the unjustifiable limitations upon the industry, the terms for new capital are exorbitant; and this has a retarding effect upon business and general service to the public. The investor has to be encouraged; and, if he is not encouraged, it follows that this public utility industry cannot be developed on dear capital to the best advantage. The President urges the protection of the investor by prescribing a minimum return on his capital, where the sliding-scale is in operation. The proportion of capital which can be raised by borrowing should also be increased. Facilities for bringing about amalgamations (without enforcing the payment of duty on the capital of acquired companies), and for permitting investment in allied industries, are also desirable objects. Further, for promoting the consumption of gas—particularly for heating and power purposes—new methods of charging are needed. These are matters which have often been discussed in our columns, and are being dealt with by the National Gas Council. To have endorsement by one in the administrative and industrial position of Mr. Cowen is highly valuable.

The address (which should have a widespread beneficial influence) ends in optimistic vein as to the future of the industry; and this from one who is at the head of the administration of a gas undertaking which for years has had to meet the keenest of competition in circumstances which, in respect of electricity generation and density of demand, have been anything but unfavourable to electricity. Notwithstanding, the gas business in the city and district has made good progress, and will continue to do so, through fine organization, considerate service, and no niggardly application of true business methods.

Domestic Electrification—Advisory Committee's Report.

The Electricity Commissioners have now before them the report of the Advisory Committee whom they appointed some time ago to consider what steps should be taken by authorized electricity undertakings to encourage and increase the use of electricity for domestic purposes, and what further action should be taken to bring about such extended consumption; also to consider the methods of charging for domestic supplies, and to advise what steps are required to give effect to their various recommendations. The Electricity Commissioners have not yet decided what they are to do with the report, now that they have received it; but their decision is apparently to come along later. It cannot be said that the report sparkles with new suggestions; and it certainly is not a masterpiece in any sense of the term. But frankly we do not think the Committee are to blame for this. What is there new in trading procedure that a dozen electrical men can devise, when all the electrical experts that the industry has had during the past half-a-century have been devoting themselves to ways and means of developing trading in electricity? The report is more or less a compilation of what has been done; and it reflects the complex mess into which electrical trading methods and tariffs have worked their way. It exposes the weaknesses of most of the methods; it expresses opinions as to which are the best, even though containing defects which assail scientific and rational tenets and proprieties. It points (as other people

have done) to the confusion of trading practices as between company and local authority electricity supply concerns, and suggests (as has been previously done) the removal of differences which place the municipally-owned concerns at, comparatively, a disadvantage. But there is nothing that shows novelty and ingenuity. The fertility of the ground appears to have been exhausted by all that has gone before. If we take the report as a whole, perhaps there is one thing that stands out clearly; and it is that the Committee are favourable to a greater uniformity in powers and practices being obtained (through statutory means) to aid in the forward movement.

The Committee are convinced that more could be done by undertakings to promote the interests of electricity in domestic operations; but they agree that the extent of this must vary considerably according to the electrical facilities offered—and, we would add, the character of the competition with which electricity is confronted. To emphasize that there is room for this, they point out that, taking the average middle and working-class houses, as operated electrically to-day in the more advanced areas, the consumption per house ranges from 100 to 300 units per annum for lighting, but reaches 1000 to 3000 units per annum when electricity is also used for cooking, partial and occasional heating, and certain labour-saving devices. All through the report, it is noticed the Committee do not rise higher than "partial or occasional" heating by electricity, which shows a candid recognition of the economic limitations of the electric fire. Presumably this means that general house heating should be done by coal, coke, or gas. But the Committee cannot bring themselves to say so, although whatever is in their minds must be one of the alternatives—smoke and dirt-producing coal, smokeless coke, or smokeless and labour-saving gas. If electricity is going to join the forces against smoke pollution, and electricity can only be used for "partial and occasional" heating, then electrical men should advise that the gas industry should be invited to fill the blanks in their capacity for service. Of course, the gas industry, without the invitation, is doing its part in filling them; but the candour of recognition by electrical men would show a superb disinterestedness, which would attract public attention and applause.

We must pass over the portions of the report which suggest that, in the expansion of electricity trading, powers should be simplified and improved regarding overhead lines and wayleaves (in which connection the Committee do not say anything about the exemption of gas-works lands); that in the case of road diversions the road authorities should pay for the alteration of the position of cables, &c.—a matter the gas industry has had in hand a long time; and that simplified procedure should be established for obtaining Special Orders (particularly relating to territorial extensions) and Fringe Orders. Coming to trading questions, the Committee blame, as hundreds of men have done before them, the high prices obtaining for electric wiring and apparatus, and, in some areas, for the supply of electricity, as being the chief deterrents to a greater use of electrical power in the home. The Committee, we think, also foresee the danger, under the Government electricity scheme, of electricity undertakings not being able to continue to make the wide distinctions in charge between lighting and other uses of the energy purchased from the Central Board. This matter was dealt with in our "Electricity Supply Memoranda" on Aug. 4 last, p. 252, when we wrote:

> We are wondering what will happen in the case of undertakings which supply at widely varying prices for different purposes when they receive supplies of electrical energy at a flat rate from the Central Electricity Board. The old argument will cease to apply—that, in order to develop the cooking and heating loads to help to keep the generating and distributing plant at work, a price which little more than covers the cost of coal must be charged. The point is, will the undertakings buying at a flat rate be able to justify their present prices? Those who will cease to generate on their own account will, we take it, be charged a uniform sum for their supply at whatever time of day the demand arises.

There has been the experience that in some cases tariffs for bulk supply "do not allow the distributors to resell at sufficiently low rates to secure certain classes of business;" and, looking to bulk supply becoming a feature of increasing importance, the Committee say: "Apart from "the obvious necessity that such supplies should be pro-"vided cheaply, it is essential that the form of the tariff "for bulk supplies should be such as to make it possible "for the distributor to obtain the diversified lead upon "which the financial success of the bulk supply depends." That is a matter which electricity distributors will have seriously to consider in the time to come as centralized generation develops.

How much expediency comes into the fixing of charges for electricity is shown by the statement in the report: "It is important to note that the cost of the supply to the "distributor and its value to the consumer vary widely with "the purpose for which the energy is used. Not only do "the effective yields in light, heat, or power for a unit "of electricity call for different charges, in order to "compete with other available forms of energy, but "the time and circumstances under which the demand "for electricity is made also justify widely differing "charges." The acknowledgment that other agents are factors in reducing the charges for electric heat and power to consumers is not frequently made. Regarding the last limb of the quotation, will not the justification diminish with the growth of central generation? For a time the point must be left; but it is obvious that a great deal of ingenuity will have to be expended upon the solution of the problem of how to adjust the bulk supply tariffs to the trading necessities and practices of the distributors.

The Committee proceed to discuss the numerous methods of charge which have been devised and applied by electricity purveyors. They deal with no less than thirteen different methods; and these do not exhaust the variants still in use. We fail to find, however, a single case in which, according to the report, there is not some disadvantage combined with the advantages; and one particular disadvantage is that most of the systems referred to—notably, the multipart tariffs—are based on factors which have little or no relation to the provision of the supply. Nevertheless, the Committee are favourable to the multipart form of tariff, in view of the fact that they do not involve duplicate sets of wiring and meters, and further give to the consumer the opportunity of reducing his average cost per unit of electricity by the process of increasing consumption. The absence of any original suggestion by the Committee in this connection is evidence of the difficulty the electricity industry has in constructing a multipart tariff based on rational factors; and it is confessed that the tariffs of this class now in use, or suggested, are not sufficiently perfect for recommendation for exclusive adoption at the option of authorized undertakings. However, the Committee consider that such tariffs should be of the simplest possible character, and should be strongly recommended; but they add that "such tariffs are of little use, and will not achieve their object, unless the alternative method is a relatively high maximum and (or) actual flat rate." This savours somewhat of an attempt to use a high maximum or actual flat rate as a lever for compelling domestic consumers to turn over to a multipart tariff. The tariff suggested as suitable is a fixed charge per square foot of regularly lighted floor area, or per "active" room, *plus* a unit charge for all purposes through one meter. For small property where coin meters are desired, the fixed charge, the Committee suggest, could in many cases be collected from the landlord, who would include it in the rent, and charge a small commission thereon. On these points, the Committee are barren of valuable suggestions. Basing the primary charge of a multipart tariff on the superficial area of the floor of a room is not new, and is not a proposal that was expected from such a constituted Committee. Further, to submit that landlords, in these days of high rents and large complaint and abuse from tenants regarding them, should add to the rent the fixed charge for electricity purposes, is not brilliant, and is not likely to have a favourable reception. Landlords have sufficient burdens to bear without voluntarily accepting this new one. However, the Committee are of opinion that the general use of the multipart tariff is a first essential to the wide use of electricity in the home; and, in their view, the tariff should include meter-rental, also the hire or hire-purchase of the wiring, installation, fittings, apparatus,

and the whole (or part) of the service cable or any other material, work, and service provided by the electricity supplier. Indeed, the Committee are strongly impressed with the importance of keeping visible ancillary charges as low as possible—preferably, to allowing the rates of electricity supply to cover such expenses.

In the next section of the report, the Committee take up the cudgels on behalf of local authority undertakings, and submit that they should have unfettered powers for trading in fittings and appliances of all descriptions, including simple hire and hire-purchase. Further, that they should have complete liberty to establish showrooms, the cost of which—their object being to increase the sale of electricity, and to promote its wider use—should be met out of the revenue obtained from the sale of energy. But they are very definite that the accounts of all trading in fittings, wiring, &c., should be kept as distinct as is practicable from the cost of the showroom. They urge control over installations, which in the past they admit have frequently been inadequate and deficient in various respects—in fact, they positively say: "The efficiency "and convenience of the average domestic installation is "much below the best practice; and this constitutes a "notable hindrance to rapid development."

There are other matters in the report which we must pass over, with the exception of finance. The Committee urge greater elasticity in the provision of working capital for local authority undertakings. In their opinion, statutory authority should be given to enable them to borrow working capital, or, alternatively, to put aside a reasonable amount of profits for the purpose. They also suggest that it is sound practice to pay for certain capital works out of surplus revenue; and also urge that the practice of using surpluses for the relief of local rates should be discontinued or strictly limited. With this there is agreement, with the qualification that, if an undertaking has been conducted in a manner which has necessitated contributions from the rates in order to liquidate deficiencies, such sums should be restored to the ratepayers until the undertaking can cry "quits." It is the opinion of the Committee that surpluses should be applied not merely to the reduction of charges which may already be reasonable, "but to those particular charges and tariffs which are calculated to encourage a wider use of electricity." This, interpreted, means that, as the largest profits are made from lighting, any surplus profits from that source should be utilized so that the largest benefit goes to the other uses of electricity, which is an admission that the lighting consumers do contribute very substantially to the ability to make attenuated charges for power, heating, and cooking.

Any individual in the electricity industry, with brains, could have written the report which has been presented to the Electricity Commissioners by the Advisory Committee, without going through the formality of holding an inquiry and hearing witnesses to arrive at conclusions which are old and well recognized, and have frequently been submitted from many other quarters.

Current Experiences and Lessons.

THE spell of cold weather which we have been experiencing (there were about 10° of frost on Tuesday of last week) has been a strong opponent of the plea for economy which has been issued to gas consumers in most districts. The contest between personal comfort and the call for economy has invariably ended, owing to the uncomfortable temperature, in the victory of the former. When the mere turn of a tap and the application of a match will relieve personal misery, it is but human nature that advantage should be taken of the convenience. The only way in which to make consumers economize in such circumstances is by reducing the pressure of the gas. This has, within the last week or two, been found in some areas to be an effective reminder of the obligation that rests upon consumers in these times of stress. We have been in certain districts where this method of forcing the claims of economy has been carried to the fullest reasonable length; but there is no doubt that, while successful in respect of economy, the loss of lighting and heating efficiency has been fairly well marked. Despite this, and although there has been a little grumbling on the part of consumers, the consistency with which through the coal stoppage a supply of gas has been given by undertakings, has impressed communities everywhere with the reliance they can place in gas at all times—even during emergencies such as this one. However, we anticipate that during the period which marked the opening of the campaign of the Miners' Federation "Council of War," gas undertakings will have been experiencing a considerable augmentation of the demand upon their mains; and all we can hope for is that, given milder weather (should the coal situation remain the same), there will be, where necessary, a drop in demand to counterbalance the recent spurt.

The present position—when coal of all grades and sorts has had to be purchased as available, and when mixtures of the different grades have had to be used as they have arrived—has had its lesson respecting the importance of the characteristics of the coal charge in the process of gas manufacture. This will be useful in urging greater attention to this vital part of gas-making operations. It is a matter which has frequently received notice in our columns; and it was brought prominently before the members of the Institution of Gas Engineers at their recent meeting. But little research has so far been made into the effects of the chemical and physical conditions of the charge. Its study and control is just as essential as the study and control of temperatures, according to the work to be done and the character of the products desired. Our electrical friends have found much the same thing during the coal stoppage. The fuel which has been sent to them has invariably been of very poor quality, and has contained a large percentage of ash. In consequence, the normal duties of steam-boilers have been sadly impaired, more fuel in consequence has had to be handled for producing the necessary steam, more cleaning has had to be done, and more labour required—in short, the efficiency of the boiler-house has been lowered all round. The cost of transporting and handling the larger quantity of low-grade material is greater than for better quality fuel, of which less has to be used for a given duty. The iron and steel industries have like experience. It is reported that, in the "sheet" industry, it takes 25 cwt. of imported coal to do the work of 1 ton of the home product. The re-heating and annealing furnaces especially disclose the inferior nature of the fuel. Not only is it found difficult to maintain temperatures, but extra labour is called for on account of the necessity for frequent stoking. In fact, it is the same everywhere; and, unless a works is in close proximity to the source of supply of the inferior fuel, and only a modest cost is entailed to bring it into the works, there is a limit to the descent in grade at which there is economy in use. For all large users of coal, there are good and bad grades. It is not the cost per ton that should be the chief guiding factor in the purchase of fuel, but the ultimate cost of utilization, having regard to the character of the results achieved, which, in the case of gas undertakings, include the quantity and quality of the products. Just now, however, these things cannot be studied; option respecting coal quality being non-existent. But the lessons from present experiences will be of value to all large coal users in the future.

Coal Freights.

It was reported at the end of last week that the freight value for coal from America had risen a further 5s. per ton, and that up to 42s. 6d. has been paid for early November, with proportionate increases conceded for loadings from December to January. Furthermore, the volume of business arranged now exceeds 250,000 tons cargo space daily.

Average Price of Imported Coal.

In the first editorial article in the "JOURNAL" last week, information was given regarding the imports of coal up to the end of September. The "Iron and Coal Trades Review" states that the average price of the coal imported in August was 38s. per ton, as against 35s. 9d. per ton in July; while in September the figure was 39s. 4d. The average price of the coal imported over the first eight months of the year was 36s. 10d. per ton; and over the nine months 37s. 8½d. per ton.

Bacteria Beds for Effluent Liquor at Coventry.

In the Presidential Address of Mr. Charles F. Tooby (Works Manager of the Coventry Corporation Gas Department) to the Midland Junior Gas Association, he mentions that a plant for the treatment of effluent liquor is now being installed at the Foleshill Works. This consists of four bacteria beds, each 120 ft. diameter by 5 ft. 6 in. deep, with the necessary revolving sprinklers, pumps, tanks, &c. The Gas Committee have granted permission for a series of tests on the plant to be made under the auspices of the Effluent Research Committee appointed by the Institution of Gas Engineers.

Water Gas for Small Works.

There does not appear to be available a large amount of experience of water-gas manufacture in such small concerns as the one referred to by "O. K." in our "Correspondence" columns last week. In view of this, let us say that it is very doubtful if there would be any economy in operating two dissimilar processes of gas production in works making (say) only 17 million c.ft. a year. Of course, there may be exceptional circumstances in the case of "O. K." which would justify the installation of water-gas plant. For instance, his demand may be increasing rapidly, or the works may be so cramped that water-gas plant would offer the best means of increasing their capacity on the present site. Again, there may be difficulty in obtaining remunerative prices for coke; or a water-gas plant might postpone much larger expenditure on additional storage, &c. It is clear that no general answer could be given to the question by "O. K.;" and that the circumstances of each individual case would have to be carefully analyzed before forming a definite opinion. A short article by Mr. Norton H. Humphrys, in a later column, has been evoked by our correspondent's inquiry. Mr. Humphrys says that the answer to the question would be influenced by the cost of coal, and the value that can be extracted from it in therms and coke, with the price obtainable for the latter. Financially, however, Mr. Humphrys does not think a small works can stand the burden of two manufacturing processes, which is a confirmation of what is said above. In such a case, there should be a definite decision in favour of one process or the other.

Economic Progress of the Gas Industry.

We have recently called attention in the "JOURNAL" to two matters which have an important bearing upon the economic progress of gas undertakings. One is the considerable saving of coal there has been through the increased production of gas per ton, and the other is the growing average consumption per consumer. Regarding the former matter, Mr. Douglas H. Helps, the Engineer and Manager of the Reading Gas Company, has been making a calculation, which shows that during a recent week about 125 p.ct. more gas was made than in the corresponding week of 1903, but less coal was actually used. Mr. Helps says: "During the week ended Oct. 10, 1903, we produced 9,686,000 c.ft. of gas, and carbonized 793 tons of coal. During the corresponding week this year, we produced 21,793,000 c.ft. of gas, and carbonized 632 tons of coal. If the conditions on our works had been the same this year as in 1903, we should have had to carbonize no less than 1785 tons of coal, as compared with the 632 tons which were actually used." The gas industry has, since the beginning of this century, made a striking contribution to national economy.

A Big Amalgamation.

There is a proposal on foot which, if consummated, will bring about one of the largest industrial amalgamations on record. It is reported that the Directors of Brunner, Mond, & Co., Ltd., Nobel Industries, Ltd., British Dyestuffs Corporation, Ltd., and the United Alkali Company, Ltd., have in progress negotiations for the formation of a new Company, for the purpose of acquiring, by exchange, the shares of the four Companies, and co-ordinating and developing their businesses and resources on broad Imperial lines. The scheme has been approved in principle by the Boards of the four enterprises. The magnitude of the transaction is indicated by the fact that the companies have an aggregate authorized share capital of £47,500,000, as follows: Brunner, Mond, & Co., Ltd., £15,000,000; Nobel Industries, £18,000,000; British Dyestuffs, £10,000,000; and the United Alkali Company, £4,500,000.

A Sale of Small Holdings.

We rather fancy the company promoters operating now more frequently from 121, Cheapside, than 43, Cannon Street, are anxious to realize some of the securities which have been purchased in other companies. The Electricity, Gas, Share, Debenture, Investment, and Guarantee Trust, Ltd. (which is an ugly, if impressive, title), have issued a circular offering for disposal a small amount of a number of shares and debentures, several of which are in well-known gas and electric supply companies. Mixed up with them are shares in certain of the promotions of this active group. We notice that at the top of the letter paper, on which the circular is printed, that one of the objects of the Trust is to "purchase, sell, and guarantee all electrical and gas undertakings securities," which is kind of them. Anybody desiring to relieve these people of the shares included in the list are asked not to make their offer for an amount exceeding £100 of each. A significant statement appears at the bottom. It is as follows: "We would point out that you already hold some of the above, and we can sell what we have for disposal 15 p.ct. under par, at which at such price (*sic*) will show a good return, with possibilities of appreciation." The fact that these people know that the recipients of the circular already "hold some of the shares," indicates that they have in their possession the lists of shareholders of the companies concerned.

New Valuations.

The first meeting of the Central Valuation Committee has been held; and they have started on their work with the blessing of the Minister of Health (the Rt. Hon. Neville Chamberlain). In the course of an address, Mr. Chamberlain stated that, in his opinion, the Rating and Valuation Act will in the future be regarded as one of the most important of the laws affecting local government ever placed on the Statute Book. Parliament has never before attempted to promote, through a central body, uniformity of valuation in the various parts of the country; and therefore it is not surprising to find that great divergencies of practice have occurred. There has, of course, been a large reduction in the number of authorities with whom the Central Committee will have to deal; but the remaining number does not excite any envy regarding the task of the Committee. Instead of having to deal with the overseers of 14,000 parishes, there will be some 1770 rating authorities, each of whom will act in co-operation with the appropriate Assessment Committee. Instead of 600 Union Assessment Committees, the Central Committee will have to deal with 350. Mr. Chamberlain further encouraged the Committee by telling them that their task would be lightened by the fact that there would be one valuation for all rates, instead of different valuations for the poor rate, the county rate, and, in some areas, the separate borough rate. Again, instead of the multifarious scales of deductions which have hitherto been in operation for reducing the gross value to the rateable value, one uniform scale has been laid down in the Act for the different classes of property.

Unemployment.

The total number of persons recorded on the registers of employment exchanges in Great Britain on Oct. 11 was 1,536,300. This was 36,400 less than the previous week, but 277,475 more than a year ago. The total on Oct. 11 is exclusive of persons who ceased work in the coal-mining industry on account of the dispute.

Research Association of British Paint, Colour, and Varnish Manufacturers.—The Secretary of the Department of Scientific and Industrial Research informs us that a licence under section 20 of the Companies (Consolidation) Act, 1908, has been issued by the Board of Trade to the Research Association of British Paint, Colour, and Varnish Manufacturers, which has been approved by the department as complying with the conditions laid down in the Government scheme for the encouragement of industrial research. The Secretary of this Association is Mr. J. B. Graham, 8, St. Martin's Place, Trafalgar Square, W.C. 2.

PERSONAL.

Mr. John Spencer, aged 71 years, has retired from the service of Blackpool Corporation Gas Department after 51 years' work there; and on Oct. 15 he received parting gifts of a silver-mounted walking stick, an umbrella, and a wallet of Treasury notes, from the staff and workmen. Mr. J. H. Chew, Gas Manager, made the presentation. When Mr. Spencer joined the department there were 2000 consumers, against 25,000 this year; and the manufacture of gas had increased from 27 million c.ft. to 1027 millions.

Mr. John W. Pallister, formerly Chief Draughtsman, has now been appointed Assistant Engineer and Manager to the Middlesbrough Corporation Gas Department.

OBITUARY.

FREDERICK TEMPLER DEPREE, J.P.

It is with profound sorrow that we have to announce the death, on the 22nd inst., after a brief illness, of Alderman F. Templer Depree, J.P., of Exeter, at the age of 76 years. Through the prominent part he took in the direction of Messrs. Willey & Co., Ltd., of Exeter, he was well known in the gas industry—particularly in London and the southern counties—and the high regard in which he was held by all with whom he came in contact was a tribute to his many personal qualities. His courtesy and his good nature were unbounded. He was a fervid upholder of all co-operative and organized work in the industry. Of the Society of British Gas Industries he was one of the stalwarts; and in all its movements from almost its inception he was a strong supporter and an active worker. As Chairman at one time of the Council, as Chairman of his appropriate Section, and as a member of various Committees, he did much valuable work; and his counsel and good judgment were always sought and esteemed by his manufacturing colleagues, to whichever Section of the Society they belonged. His fine presence and genial countenance will be sadly missed by them all. Alderman Depree was also Chairman of the Devon Gas Association—a combination of small undertakings which, under his guidance and that of his colleagues of the Directorate, have reached a high degree of working efficiency. Of Exeter he was a citizen upon whom men relied, and whose friendship was courted. The funeral service is being held to-day in Exeter Cathedral; and, though writing before the last words of farewell are uttered, we are confident there will be many mourners in that sacred edifice.

INSTITUTION OF CHEMICAL ENGINEERS.

The following is a list of new members, associate members, graduates, and students of the Institution.

Members.

John Fisher Carmichael, B.Sc., F.I.C., Managing Director of Messrs. J. F. Carmichael & Co., Ltd.

Samuel Irwin Crookes, M.I.E.E., Consulting Engineer, Auckland, New Zealand.

Sir Robert Abbott Hadfield, Bart., D.Sc., D.Met., F.R.S., F.I.C., M.I.Mech.E., &c., Chairman and Managing Director of Messrs. Hadfields, Ltd.

David Maelor Hughes, Coke Oven Manager, Hoyland Silkstone Coal and Coke Company.

Arthur Marsden, F.I.C., Deputy Engineer and Manager to Stapleton Road Gas-Works, lecturer in Applied Chemistry at Bristol University and Merchant Venturers' College.

William Reginald Ormandy, D.Sc., F.I.C., Consulting Chemical Engineer, London.

John Stewart Remington, Chief Chemist and Director of Research to Frickers Metal Company, Ltd., Luton.

Associate Member. (*By Examination.*)

Frederick Oliver Hawes, Technical Chemist, Gas-Works, Tottenham.

Graduates.

Norman John Ivison, B.Sc., Chief Chemist to Messrs. Stephenson Clarke & Co., Ltd., Sunderland.

Reginald Alfred Turner, A.M.I.E.E., A.M.I.Mar.E., Assistant Engineer to the Asiatic Petroleum Company, Singapore.

Edward Wallis, B.Sc., Research Chemist to Messrs. Salamon & Co., Ltd., Rainham, Essex.

Student.

Cecil Alwyn Reginald Stead, Technical Student to British Sugar Manufacturers, Ltd., Wakefield.

Southern Association of Gas Engineers and Managers.—A general meeting of the Association will be held on Friday, Nov. 12, at 2.15, at the Hotel Cecil, Strand, W.C. President and Vice-President for 1927 will be elected, and two papers will be read—one by Dr. E. W. Smith, on "Low-Temperature Carbonization;" and the other by Mr. R. H. Ruthven, on "Corrosion in Works."

"B.C.G.A." PRESIDENT, MR. JOHN E. COWEN.

The President of the British Commercial Gas Association comes from a well-known Newcastle family. He is the grandson of Sir Joseph Cowen, who was first Chairman of the Tyne Commissioners and M.P. for Newcastle for some years, nephew of Joseph Cowen, the well-known politician, *litterateur*, and social reformer, and son of Colonel John Cowen, also a Tyne Commissioner, a great sportsman and pioneer of the Volunteer movement. Mr. John E. Cowen early became interested in the collieries and fireclay businesses founded by his family. Born in 1873, he first travelled extensively on the Continent developing the sale of retorts and firebricks with gas-works and other users. Later he became more particularly interested in the iron foundry business of Smith, Patterson, & Co., of Blaydon-on-Tyne, of which his father was one of the founders and first Chairman. He has been a Director of this Company for thirty years, and is now its Managing-Director and Chairman. He is also a Director of Walter Scott, Ltd., the Redheugh Bridge Company, the High Gosforth Park Company, and—since 1918—Chairman of the Newcastle and Gateshead Gas Company, on whose board he has been since 1906. Besides being one of the most prominent industrialists of the North, he is a Justice of the Peace, Chairman of the Newcastle Diocesan Finance Board, and—like his father—a keen sportsman.

FORTHCOMING ENGAGEMENTS.

Oct. 29.—London and Southern District Junior Gas Association.—Meeting at the Westminster Technical Institute. Presidential Address by Mr. A. Broadbent.

Nov. 3.—Institution of Chemical Engineers.—Annual presidential reception at the Gallery of the Royal Society of Painters in Water Colours, 5A, Pall Mall East, S.W. 1, at 8.30.

Nov. 3.—Manchester and District Junior Gas Association.—Visit to the Huddersfield Corporation Gas-Works and to the works of Messrs. W. C. Holmes & Co., Ltd.

Nov. 6.—Scottish Junior Gas Association (Western District).—Meeting at the Royal Technical College, Glasgow.

Nov. 9.—National Gas Council.—Meeting.

Nov. 9.—Federation of Gas Employers.—Meeting.

Nov. 11.—Society of British Gas Industries.—Autumn general meeting at the Hotel Cecil, under the presidency of Viscount Ednam, M.C.

Nov. 12.—Southern Association of Gas Engineers and Managers.—General meeting at the Hotel Cecil, Strand, W.C., at 2.15.

Nov. 19.—Efficiency Club.—Discussion on the Relative Fields and Merits of Gas and Electricity.—7.30 for 8. Vernon House, Park Place, St. James' Street, S.W.

Nov. 20.—Yorkshire Junior Gas Association.—Meeting at Sheffield.

Dec. 7-8.—Institution of Fuel Technology.—Meeting.

Feb. 16.—"B.C.G.A." Midland District Conference.

Institution of Gas Engineers.

Nov. 9.—Advisory Committee on Education.

Nov. 10.—Emergency Committee. Finance Committee.

INSTITUTION OF GAS ENGINEERS.

The following names have been approved by the Council for insertion in the next ballot list as candidates.

Members.—Mr. Archibald Thomas Kyle (Engineer and Manager, Corporation Gas-Works, Abergavenny) and Mr. John H. Wainwright (Engineer and Manager, Gas-Works, Halesowen).

Associate Members.—Messrs. John Alex. Gould (Assistant Mains Superintendent, South Metropolitan Gas Company), Edwin Chas. Nash (Technical Assistant, Rotherhithe Works of the South Metropolitan Gas Company), Allan Robin (Chief Assistant to the Engineer and Manager, Holywood Gas Company, Co. Down), William Edward Stephenson (Chemist, South Bank and Normanby Gas Company), and Charles C. Wood (Assistant Manager, Wellingborough Gas Light Company).

Transference.—Messrs. James Howard Goldsmith (Institution's Diplomé in Gas Engineering, 1st class, with distinction, 1926, Works Assistant, Sydenham Works of the South Suburban Gas Company), Frank Lambert Scaife (Assistant Manager, Corporation Gas-Works, Stockton-on-Tees), and Sydney Smith (Institution's Diplomé in Gas Engineering, 2nd Class, 1925, Chief Chemist, Birkenhead Corporation Gas-Works) have been transferred to the class of member.

Studentship.—Mr. Donald Lambert Brown (Articled Pupil to Mr. C. H. Rutter, Brighton and Hove Gas Company) and Mr. Stanley H. L. Mugford (Assistant Engineer, St. Mary Church Gas-Works, Borough of Torquay) have been admitted as students.

ELECTRICITY SUPPLY MEMORANDA.

SOME time ago, we announced that the Electricity Commissioners had, under the provisions of section 4 of the Electricity Supply Act, 1919, appointed an Advisory Committee on domestic supplies of electricity and methods of charge. They did this because, impressed by the marked increase which, they say, has taken place in the utilization of electricity for domestic purposes, they believe the scope is great for the further extension of the electricity business. Another thing which weighed with them is the number and diverse character of the tariffs and methods of charge which have already been adopted or proposed with the object of encouraging the wider use of electricity for such purposes. It was thought by them that an investigation might result in practical proposals which would assist the efforts of the industry to bring about an increased consumption of electricity for domestic purposes, and lead to the simplification and greater uniformity of tariffs and methods of charge. The report of the Committee has been published. The Commissioners observe in a "Foreword" that they have not yet fully considered the proposals; but, as the document is likely to prove informative to the industry and the public, they decided to publish it immediately. With several of the suggestions made by the Committee, there is no difficulty in agreeing; but we fail to discover anything of a novel nature. Most of the proposals have been suggested and discussed on previous occasions; and we incline to think the electricity supply industry will be disappointed that a Committee of such strong constitution could not find anything of a more original character to put before it. The Committee was composed as follows—Representatives of the British Electrical Development Association: Mr. J. W. Beauchamp (Chairman), Mr. S. T. Allen, and Mr. A. N. Rye; of the Conference of Chief Officials of the London Electric Supply Companies: Mr. W. A. Pearman and Major H. Richardson; of the Incorporated Association of Electric Power Companies: Mr. J. S. Highfield and Mr. W. B. Woodhouse; of the Incorporated Municipal Electrical Association: Mr. A. C. Cramb and Mr. W. C. P. Tapper; of the Provincial Electric Supply Committee of the United Kingdom: Mr. H. Bentham, Mr. F. E. Gripper, and Mr. K. A. Scott-Moncrieff.

Advisory Committee's Report.

Overhead Lines and Wayleaves.

The report is of considerable length; and many of the matters are of purely domestic character. Some of the considerations which influence the Committee are discussed in an editorial article on an earlier page. We will therefore confine ourselves here to matters which interest the business competitors of the electricity supply industry. The Committee suggest that there should be larger general powers in regard to the use of overhead lines; that there should be official recognition of standard prices for wayleaves; and that local authorities who make or carry out alterations to roads should be liable for the cost to statutory undertakers of altering the position and (or) depth of mains and services. The same provision should apply to alterations to road bridges. It is recommended that undertakers should be authorized to attach brackets to buildings for the carrying of overhead lines, lamps, and apparatus. A wayleave schedule, with appeal against unreasonable refusal of consent, would also be of assistance. It is suggested that 1s. per annum per bracket would be an equitable standard charge in most cases. Simpler procedure is required for obtaining Special Orders for the extension of existing areas. The scope of present legislation in respect of "fringe" Orders, it is thought, should be widened; and the procedure should be simplified and amended to obviate delays.

Trading Recommendations.

This is the part of the report in which the gas industry will be chiefly interested. In this regard the summary of recommendations deals first with tariffs. It is stated that no multi-part tariff now in use, or suggested, is sufficiently perfect for exclusive adoption at the option of authorized undertakers; but the use of such tariffs (by agreement) of the simplest possible character should be strongly recommended for domestic supplies. Such tariffs, however, it is suggested, should be coupled with a relatively high maximum and (or) actual flat rate as an alternative; should need only one meter; and should not involve frequent inspection of premises. The Committee recommend that the Commissioners should urge all supply authorities to offer, on demand, an alternative two-part tariff for the supply of electricity for all domestic purposes, including meter-rental. Also that all undertakers should have statutory authority to make tariffs and charges in certain cases, inclusive not only of a charge in respect of electricity consumed or contracted for, but also in respect of the hire or hire-purchase of wiring, fittings, apparatus, &c. It is the view of the Committee that full trading powers should be granted to local authority undertakers not at present possessing them; or that undertakers should be encouraged to make available to all consumers a hire and (or) hire-purchase system for wiring, fittings, apparatus, &c., coupled with an efficient maintenance service. Undertakers should also sell appliances and apparatus at usual retail prices. The suggestion is made that any doubt as to the legality of the establishment of showrooms by local authorities should be removed; and very wisely it is proposed that the accounts of the trading in fittings, apparatus, wiring, &c., should be kept separate from the cost of the showroom viewed as an advertising and educational item only, and from the accounts relating to the sale of electricity. It is further suggested that methods of overcoming the difficulty as regards the initial cost of wiring, by hire or hire-purchase systems (payment being spread over a period, and associated with the payment for the supply of electricity or otherwise), should be encouraged wherever the first cost of wiring is found to offer any difficulty. The advice is given that steps should be taken to remove the doubt felt by some local authority undertakers as to the legality of expenditure on local educational publicity. The Committee are favourable to the growing tendency to pay for certain capital works out of surplus revenue, particularly where the alternative would be a loan for a very short period. Regarding the highly polemical subject of the application by local authority undertakers of a surplus to the relief of the local rates, the Committee think this practice should be discontinued or strictly limited. Any surpluses in their opinion would be more properly applied to development of works, and to reduction in the charges for electricity. One other point. The present method of assessment for local rating, it is considered, requires immediate amendment. Electricity undertakings, in the view of the Committee, should be assessed on the basis of the profits of the undertaking, with a rebate of such a sum as would represent 75 p.ct. of the amount payable on account of the general district rate in respect of underground cables and works.

Failures.

Few people have heard of Billingborough (Lincs.). It appears that they have a gas-works there; and the "Electrical Times" learns that, owing to inadequate supplies of suitable coal, the works had to interrupt the supply of gas. Business establishments, it also announces, had to revert to candles and lamps. We congratulate our contemporary on this discovery of a failure of gas supply. The case emphasizes the rarity of such occurrences. Electricity consumers devoutly wish they could bear testimony to collapses of electricity being equally uncommon. They are so frequent that there are few cities and towns where the retailers of candles and oil-lamps do not have from time to time nice booms in business through the helpful collaboration of electricity. For many years we have had occasion to notice the weaknesses and vagaries of electricity in this particular. Glancing through recent newspapers, we observe that, on a certain Friday night, passengers on the Ostend steamer had to have their luggage examined at Dover by candle light; the electric current having failed. In the "Evening Standard" on Oct. 15, we read that Tottenham Court Road Tube Station was the scene of great excitement during the early rush hours that day, owing to the main cable feeding the escalators having fused through injury caused by a man cutting into it with a chisel. On the same day, people in Basinghall Street were startled by an electric box blowing up. But little Billingborough is quoted to set against the long record of electrical accidents!

Fuel Difficulties.

Electricity undertakings have been finding that it is not only the increased cost of fuel which is a present difficulty, but that the inferior character of much of it for steam-raising

necessitates the use of a greater amount for a given output. The cost per ton is therefore *plus* the additional consumption demanded. We hear a great deal about the electricity industry using the poorer qualities of coal for steam-raising; but, of course, there is a point at which low-grade fuel becomes uneconomical for that purpose. For a specified amount of work, a larger quantity has to be conveyed and handled, more labour is needed, more plant and special equipment, and, with a fuel containing 18 to 20 p.ct. of ash, there is more work to be performed in the removal of ash and clinker. Careful supervision is also an essential. Therefore, both capital and working charges are raised; and the fuel must be delivered at a very low price per ton to provide the compensations. However, these things cannot be helped just now; but in ordinary times it is necessary to weigh well the disadvantages of a low-grade fuel against the advantages of one of better grade, and to take all costs into consideration. The appeal to consumers for economy in the use of electricity, we learn, is not generally having the hoped-for effect. Anything on tap, and the tap under the control of the user, limits the capacity of the undertakers for bringing about economy, no matter how exigent the need.

Chambers of Commerce and the Bill.

There is no question that the large Chambers of Commerce throughout the country are practically unanimously opposed to the Government Electricity Bill. The great industrialists are satisfied, or at any rate have good ground for their fears, that the cumbersome methods which the Government are proposing for attempting to achieve certain results will impose higher costs upon the centres of industry, in order to provide electricity in the less populous and less profitable areas of the country. On balance, such a condition of things would be inimical to the interests of industry. The Association of British Chambers of Commerce lately held their annual meeting in Hull. On the occasion, there was a full-dress discussion on the subject of the Bill. The initiative was taken by the Leeds Chamber of Commerce, who submitted a resolution which was intended to express the views of the members of the Association on the subject. It placed on record the opinions: (1) That the management of the stations by efficient undertakings, and the supply by them of electricity direct to the consumers in their own areas, should not be interfered with; (2) that the provision of a supply for other areas could be assured by an obligation on those undertakings to supply the Board in bulk on fair terms; and (3) that consumers in industrial areas should be safeguarded against any burden arising from supply in unprofitable areas, and from the cost of standardization of frequency. By Alderman Hugh Lupton (who moved the resolution) it was urged that the Bill will bring about an extraordinary and unnecessary interference with ownership. As a matter of fact, the objects aimed at by the measure are already being accomplished by normal evolution. The great companies and municipalities are concentrating their loads upon the best stations, and taking in the small outside places. If the Bill becomes law, it will, in the view of Alderman Lupton, act as a drag on investment, and will increase cost of production. In his opinion, the only hope of stopping this measure of "very evil nationalization" is to take strong steps so that it shall not pass the third reading in the House of Commons, or, if it does, that the House of Lords should deal with it. Another prominent Chamber of Commerce is that of Newcastle-upon-Tyne; and, representing it, Mr. Walter Raine, M.P., seconded the motion. There was very little sympathy with the suggestion of Mr. Arthur Neal (Sheffield), that the object of the Government was to secure that this country should not be left behind in the matter of electricity. From Mr. W. B. Woodhouse, the members learned that the opinion of the body of electrical engineers throughout the country is opposed to the Bill. He considered that the scheme is not a sound one, and that it ought to be gone into very thoroughly before it passes into law. Sooner or later, he pointed out, the cost of the working of the new Board and any loss which might be incurred would fall on the electricity industry, and therefore on its customers. It transpired that the Executive Council of the Associated Chambers are already in touch with the Government on the subject; and, in view of this, one of the Vice-Presidents—Sir William Clare Lees—suggested, as an amendment, that the resolution should be referred to the Executive, and that, in any representations made to the Government, consideration should be given to the points raised in it. The suggestion was accepted; and the resolution, as amended, was adopted. The Government will not care to avoid consideration of representations from such an influential body.

WATER GAS FOR SMALL GAS-WORKS.

By Norton H. Humphrys.

The inquiry from "O.K." (*ante* p. 175) is no doubt strongly on the minds of all who are to any extent interested in the management of small gas-works. Few, if any, are in a position that warrants raising the price of gas to an extent sufficient to cover the cost of coal, following the established practice of passing on increased expenditure of every kind to the customer, without incurring the disagreeable accompaniment of a loss of sales, which will be to some extent permanent. They have no prospect of assistance from the State, from sympathizers, political or otherwise, or from Russia and other foreign nations desirous of injuring British status and trade. There is no share in the bonus, no poor relief, no "living wage arrangement," now so extensively applied, for them. Except in the small matter of the price of coke, they are unable to follow the coal owners by raising prices hand over fist to an extent that will soon show a profit arising out of the strike. They are among the class who, by reason of being bottom dog, will bear the brunt of the burden brought about by an attempted stride towards anarchy, for which the miners have been willing to act as stalking horse.

The continuous trend of legislation towards facilitating the execution of programmes favouring the declaration of strikes involving millions of workers created a strong impression, even twenty years ago, that a second string to the gas engineer's bow was desirable. This view is certainly not weakened by later experiences.

Limiting Size.

The writer made a practical trial of a carburetted water gas plant in a 20-million works, about 1913; but the result was a complete failure. The limited diameter of the firegrate and the cylinder above enabled even a small accumulation of clinker to prevent that attainment and maintenance of high temperature known to be necessary if the gas is to be reasonably free from carbon dioxide. Constant attention meant a high cost for wages per 1000 c.ft. of gas made. As the plant was frequently opened for cleaning (which meant stoppage of active service), the interior of the cupola would not run for more than a fortnight without relining. At a second gas-works, making 80 million c.ft. per annum, a set in duplicate (nominal capacity, 100,000 c.ft. per 24 hours, or 50,000 for one cupola) was also a practical failure for similar reasons, and soon came to be regarded as nothing more than a stand-by for emergency. At another works a single set, claimed and proved to be equal to 150,000 c.ft. per 24 hours, was a success, and was in regular operation for some years. The conclusion arrived at was that anything smaller than about 100,000 c.ft. per hour (and that maintained in full stride) was not likely to be successful or satisfactory. If any evidence, including practical working through a winter season, and a summary of an accurately kept record of consumers' complaints, is now forthcoming in proof that this view is out of date, no one will be better pleased than myself.

Altered Conditions.

To-day conditions are altered. Later experience has led the way to structural improvements, and this advance has been aided by past failures. But even at the best, the small cupola is better suited for purposes and places where no restrictions as to declared value are in force, or during the suspension of such regulations. Even then, one would like to hear anything that consumers of a good quality straight gas for some years had to say about a mixed gas.

On the other hand, there are altered conditions as to coal and labour. Retort house working when the coal supplied is entirely without guarantee is a very different thing from operations on material of even composition competently selected as best to suit requirements. The answer to "O. K.'s" question would be influenced by his present costs of coal, the value that can be extracted from it in the form of volume of gas, therms, and coke, and the prices obtainable for the latter.

One Plant the Solution.

A plant complete and ready for use could not be put down at less than £1000, and the interest and upkeep would spoil £150 per annum. The cupola requires frequent repair, especially under intermittent working. On the whole, it seems that a small works cannot stand the burden of two manufacturing processes, and should definitely decide on one or the other.

BRITISH COMMERCIAL GAS ASSOCIATION.

FIFTEENTH ANNUAL CONFERENCE, NEWCASTLE, OCT. 25-27.

PRESIDENTIAL ADDRESS of MR. JOHN E. COWEN, Chairman of the Newcastle-on-Tyne and Gateshead Gas Company.

At the Annual Conference of this Association held in Glasgow in 1921, which was the first to be held after the official declaration of Peace, Mr. Milne Watson, as President, in referring to the general position at that time said: "But for all this we live in a world sorely troubled and disturbed, still restless and dissatisfied and disillusioned. Disillusioned because the wild impracticable hopes that were engendered by the war of an imminent 'new heaven and new earth' where in particular less work by each was to produce a better standard of living for all, have not been realized. It is as necessary for us as a nation to get over this disillusionment as to get over the war—indeed the one is a necessary precedent to the other."

Appeal to Trades Unions.

I agree entirely with that dictum; and to-day, five years later, I ask myself the question: How far have we as a nation got over that disillusionment? When one thinks of the events of the last six months in the industrial world, one cannot help coming to the conclusion that there are still a large number of people, and many of them in responsible positions, who have not yet got over the disillusionment at all. We have seen this year an even greater industrial dispute than that of 1921, and unfortunately in the same trade—the trade which, probably more than any other, has been the basis of our commercial pre-eminence in the past, and the successful carrying on of which to-day is of the utmost importance to the whole of our industries. In the general strike, as in the coal dispute, we have seen such confusion of thought and such an ignoring of plain economic facts by Trades Union leaders that one is driven to the conclusion that at least a section of those in control have entirely lost sight of the functions of Trades Unions, and are subordinating the real interests of their members to purely political objects. It is for the Trades Unions in the first place to purge themselves of such leaders, and it is for the employers to encourage and assist in every way they can the great body of loyal workers, who, after all, form the majority of the trade unionists of this country, to put their house in order. The conditions under which we as a nation are at present trying to run our industries constitute a very severe—I might almost say impossible—handicap; and unless many of these conditions are altered both on the side of the employer and on that of the employed, we cannot hope to attain that prosperity which alone can give a higher standard of living to all.

False Policy of Restricted Output.

In looking first at the employees' side, it would certainly appear that the attitude of many of the Trades Unions is a wrong one, inasmuch as it aims at restriction of output, the result of which is dearness of commodities. Under the rules of some of the Unions, members are finable if they do more than may be considered a reasonable day's work, or if on any job for which a certain time is allowed the whole time allotted is not absorbed. The introduction of piece work and the working of overtime are opposed in every possible way. Some even restrict the number of apprentices that may be taken on; and the demarcation between the work that may be carried out by various trades is in many cases ridiculous, and involves a great deal of extra cost in production. The whole policy seems to be based on the idea that the slower the individual works, the greater will be the number of those employed. The fallacy of this idea has often been exposed, and some of us are perhaps rather tired of trying to drive home the truth in these matters. We have, however, certainly been encouraged lately by the attitude taken up by one of the clearest thinkers in the Socialist party. I refer to Mr. Philip Snowden, who has recently been advocating in the strongest way the policy which has been pursued with such striking success in America—that of maximum production. He has rightly said this can be achieved by the proper application of the system of payment by results; and he used these striking words: "A new conception of industrial methods will have to be adopted. Abundance should be the motto and the aim. Abundance will give high wages, regular employment, and cheapness." It is not only in manufacturing that unnecessary regulations are hampering our trade; but in such matters as the loading and discharging of ships, restrictions as to hours of work are helping to pile-up the cost of such operations in this country far beyond those current in other countries. We have had many experiences during the recent mining dispute of cargoes of 10,000 tons of coal being loaded in the United States in a single day. Nothing approaching these figures is done in this part of the country, although we are a regular coal exporting district. Again, with regard to house building, the London County Council, for instance, have found that, whereas a man in 1913 laid 900 bricks per day, in 1920 he was only laying 250; and in the evidence given in the Hollis case, Hollis stated that when in America he had laid 1500 bricks in a day.

Then there is the enormous amount of time lost by disputes. In the five years ending 1924 the equivalent of over 30 million working days per annum were lost by disputes. Other instances might be given, but the above are sufficient to indicate some of the handicaps we are up against on questions of labour.

Our Labour Systems Encourage Waste.

Our present labour systems do not permit of the best service, because they encourage every kind of waste. We maintain the most incompetent at the same level of pay as the most intelligent, and the latter are discouraged from earning what they could, and so improving their positions. If we are to remain one of the great industrial nations of the world, there must be a radical change of outlook and spirit and system in industrial matters; and the urgency of the change is unprecedented.

It may be asked what is the value of being a great industrial nation; and my answer would be: If it does not make for a higher standard of living for our people, there is no value in it.

The visionary Socialist's remedy of the nationalization of the means of production, distribution, and supply, is no remedy. To prove this, we only need to look at the results of the various experiments in this direction in different parts of the world. Let it be recognized beyond question by all classes, that the breaking-up of the existing order of things will not bring the millennium; that the existing foundations and constitution of society are sure and solid; and that what we have to do is to improve the structure raised upon those foundations.

For this purpose we must all work together harmoniously both industrially and socially; and this alone can make for personal freedom and happiness. The super-structure cannot be satisfactory if the architects and the builders are in continuous disagreement; both mental and physical labour must work in harmony. Never was it more necessary to stop and think and review our position both as employers and employed. Let both sides get down to facts and realities, and endeavour with goodwill to bring this country back to prosperity, for the general prosperity of the nation is the only true source of prosperity for all classes of our population.

Need for Greater Output.

Fortunately some of the leaders of labour are beginning to recognize this. Suggestions have been made for a five years' peace. Peace alone, while of great value, and indeed a necessity, is not, however, sufficient to meet the present crisis; we must have greater output per man, if we are really to succeed. The importance of this in all industries is apparent when we consider the enormous labour cost involved in the production of almost any article. We often hear it stated, for instance, that the proportion of labour to the total cost of coal at the pithead is 70 to 75 p.ct. This, however, is only the direct labour cost; there is in addition the indirect cost (in some cases foreign labour) in the timber and other stores used, which makes the percentage much higher. Sir Frederick Mills, who has studied the subject of percentages of ultimate labour costs, states that coal shows a total labour cost of 90 p.ct., of which 83 p.ct. is British (72 p.ct. being direct, and 11 p.ct. indirect) and 7 p.ct. foreign.

It might be thought at first sight that coal would show a specially high labour cost; but the same authority states that the ultimate labour cost of nearly all commodities is from 90 to 95 p.ct., even in such dissimilar things as a postage stamp, a railway rate, a loaf of bread, a telephone call, or 1000 c.ft. of gas. I am stressing this point because, if the figures I have quoted are only very approximately correct, it is at once apparent what a great reduction in costs and what an immense advantage to industry can accrue from a greater output per person employed, be he manual or brain worker.

No Attack on Wages.

I am not advocating reduced rates of pay, but more output for the wages paid. It does not follow that the men employed in manufacturing the article containing the lowest labour cost per unit are the men with the lowest weekly wages. It depends entirely upon the amount of work done at the particular rate of pay. The greater the quantity of work performed, the higher the wage that can be paid. The real cause of the prosperity of America is the greater output per man, which has reduced the cost and increased the demand; and this has largely been brought about by the application of the system of payment by results. If we are to have a large extension of that system in this country, mutual trust and confidence must take the place of suspicion between employer and employed.

The Employer's Part.

In the gas industry we have gone a long way to create the necessary atmosphere for this change; and while I do not claim

that we are by any means perfect, the gas industry has at least set an example by its profit-sharing and pension schemes, and by its sliding-scale system of charging for gas, under which, when a reduction in price takes place, everyone benefits.

Let it be admitted that the employer must make his contribution to reconstruction, and let him show that he is prepared to do so as a necessary complement to the fuller contribution of labour I have referred to.

Modern Methods and Cheap Heat.

Let such questions as the use of the best plant and machinery for the purpose in view, the greater application of science to industry, the best methods of marketing and selling, and all similar questions, receive from the employer greater study and more detailed application than ever before. The help that one industry can give to another in such matters is important. Take, for instance, the question of fuel. I believe the gas industry can help many trades in this direction, not perhaps so much the heavy trades of this district as those in many other parts of the country; and in considering this question I would urge manufacturers to bear in mind two facts—first, fuel for heat is more important than fuel for power. More than half the coal consumed by British industry is ultimately used for the production of heat. It takes upwards of 3½ tons of coal to make a ton of steel; and in the heavy industries generally, which are suffering most, the fuel bill for heat is far heavier than that for power. The second point is that, while fuel for heat is important, what matters most is not its price per therm —that is, per heat unit (though "cheap heat" would be a far better political cry than "cheap power")—but its method of application and the economies that can be obtained by its use.

Gas Lowers Costs of Production.

I will give you two instances from experience. A firm which substituted a gas-fired rivet-heating furnace for a solid fuel furnace found that the cost for fuel for heating a given number of rivets at the rate of 100 per hour was reduced by over 50 p.ct., while in addition the floor space occupied by the furnace was reduced from 3240 sq.in. to 670 sq.in., and the shop space required for coal and ash stacks in the case of the solid fuel furnace was rendered available for other purposes.

The second instance is this: Heavy crane chains, as most of you know, have to be periodically annealed to remove strains. By using a gas-fired furnace in place of a solid fuel forge, a London firm has reduced the time taken in annealing a chain of 1 in. rod, 400 ft. long, from several days to six hours, and the labour involved from three men to one man.

The first example illustrates particularly the saving in space—involving building costs, rent, and the like. The second example illustrates the saving of time and labour costs.

Sir Arthur Duckham, speaking before the World Power Conference, calculated that even in industries in which fuel cost is a major item, it often pays to use gas at a price per therm from three to six times that of coal. In other industries in which fuel cost is still an item, but consideration of transport, storage, ground space, labour, and the other advantages given by gaseous fuel are prominent, it pays to use gas at a price per therm five to ten times that of coal; and there are many industries—such as textiles, hat making, boot making, the motor car industry—in which the use of gas presents such great advantages that it pays to consume it at a price from ten to twenty times the price of coal.

These facts show that the gas industry does offer a real hope to many manufacturers of lowering their costs of production without cutting rates of wages or without abandoning the standard of high quality which is the chief selling-point of British products.

Standardization Pays.

I would just refer to one other matter which I think is worthy of the closest study by manufacturers—namely, the simplification and reduction of the variety of goods produced. In "The Times" Trade and Engineering Supplement of Jan. 16 last, an account was given of the study of this matter in America. It has been found that in most industries about 80 p.ct. of the production and sales is upon 20 p.ct. of the varieties of goods manufactured; and the object should be to eliminate as far as possible the varieties having the smallest sales. This simplification and reduction of varieties has been applied in America to 400 branches of industry, and some of the results are remarkable—among them pipe fittings showing a reduction of 96 p.ct., and stove parts a reduction of 88 p.ct. This is a matter which the gas industry itself would do well to study carefully.

Some years ago we applied the principle in Newcastle with regard to gas cookers and gas fires, with most satisfactory results. The leading firms of gas apparatus makers have certainly moved in the direction indicated of late years with advantage to buyer and seller alike, but much more remains to be done by them, as well as by manufacturers generally.

Co-operation Pays.

There is no doubt that prosperity and an increased standard of living can be brought about by increased output per man, in conjunction with the study of such problems as I have referred to, and others of a similar nature, and by the removal of suspicion between management and men.

In this regard, the shipyard employers and shipyard unions are to be congratulated upon making recently a joint inquiry for the purpose of ascertaining how British shipbuilders may reach prices which will compete successfully with those of foreign shipbuilders. Such inquiries should certainly be extended.

In referring to the general industrial position, my object has been to use the influence of the position with which you have honoured me to appeal for a change of spirit in industry by labour leaders, workers, and employers alike. Let them all realize that the prime necessity for the saving of British industry to-day is industry, work, more work, and better work by all—not by the manual worker alone, but by the director, the manager, the staff, and the foreman as well. Let co-operation take the place of suspicion, and let the co-operation not be in any ungenerous spirit on either side. Let the worker understand that the employer wants to improve the worker's standard of living. Let both sides in each trade get together and study the problems of their trade to see where production costs can be reduced; for it is cheaper production alone that can bring increased trade, and with it an improved standard of living to the people of this country.

Financial Restrictions on the Gas Industry.

With more particular regard to our own industry, it can surely be congratulated upon the manner in which it has served the public during the mining dispute. Practically throughout the length and breadth of the land the supply of gas has been abundant during the whole period. The pressure and quality of the gas have been of a high standard, in very difficult circumstances. The industry has also greatly assisted the country by its supplies of coke and other residual products.

As an industry, we were of the utmost national value during the war, and we have been so again during this unhappy industrial struggle. May I suggest that it is time the Government recognized our value in more than words, and relaxed some of the present statutory enactments which are bearing hardly upon us—financial restrictions in particular? Companies find difficulty, owing to present statutory enactments, in raising capital at reasonable rates.

Encouraging the Investor.

As you all know, gas companies (with one or two exceptions) are divided into two classes—one in which, if it raises the price of gas, the dividend must go down, and the other which has a maximum price and a maximum dividend prescribed. During the war, when the prices of all commodities became so high, the weaknesses of these arrangements revealed themselves, and dividends of most companies went down to very small figures, with the result that the investor has become afraid. In our case, for instance, we issued ordinary stock by tender in February, 1914, giving a yield to the investor of just under 4½ p.ct. The market price of the same stock to-day gives a yield on present dividend of over 7 p.ct. Other companies are in a similar position. To spend large sums on capital at such rates must eventually have a very serious effect upon the price of gas. What is required is more security, to give confidence to the investor, by the companies being authorized to pay a prescribed minimum dividend irrespective of the price of gas. By all means protect the public and leave an incentive to the companies to increase the dividend by lowering the price of gas, but protect the investor also by a minimum return on his capital.

Another matter which would be of financial assistance to the industry is the extent to which money may be raised by mortgages and debentures and by preference stocks. The proportion of capital allowed under these heads has been gradually increased in the past, but requires further extension, as capital can, of course, be raised more cheaply by these means than by ordinary stock. This, again, would be to the benefit of the consumer. We do not want assistance by way of Government guaranteed money, but we do consider that we should be put into a position to raise the money needed to carry on and develop the industry as cheaply as possible ourselves.

Amalgamations and Lower Prices.

We desire amalgamations to take place where such will result in economies, as this means lower prices for the consumer. I believe the Government also desire this; and therefore they ought to remove such obstacles as the enforcing of the payment of duty on the capital of acquired companies, which capital has already borne duty. In the Act under which the Government grouping of railways was carried out, and also in the present Coal Mining Industry Act, provision was made for this point.

We also require greater latitude with regard to the holding of shares in allied industries, under which benefit may be derived by gas undertakings, and consequently by the consumer.

New Methods of Charging Needed.

We further require, in these days of keen competition, greater latitude in our methods of charging for gas. Our competitors are at liberty to make charges in accordance with the effect which the demand of the consumer, as regards time and quantity, will have upon the finances of the undertaking, and also to take into account the fact that many charges which go to make up the price of the commodity are the same in total amount for the smallest consumer as for the largest. The flat-rate system imposes hardships upon the large consumer, and limits the

development of our business. In America great attention has been paid to this matter; and while it does not necessarily follow that American practice in its entirety would be best for this country, as the differences in conditions must be taken into account, yet the gas undertakings here should be placed in such a position that they could adopt a system of charging other than the flat-rate system, without suffering with regard to the rate of dividend payable.

The National Gas Council, I know, are watching these matters very carefully; but I feel no opportunity should be lost of letting the public, and particularly Members of Parliament, know the disabilities under which we suffer. Government action will thereby be stimulated and encouraged, so that restrictions may be removed which are just as much a drawback to the users of gas as they are to the suppliers of it.

I would like to congratulate the National Gas Council on the protection obtained in the Government Electricity Bill by the clause providing for appeal.

Parliament and Domestic Smoke.

When at the Smoke Abatement Exhibition in Birmingham last month, I could not help feeling it was a great pity that more had not been done by legislation in the way of abating the smoke nuisance. It is true that a Bill is at present before Parliament dealing with industrial smoke, but nothing has been done so far with regard to domestic smoke—the real offender. Parliament has not taken in hand the purification of the air in the same way as has been done with our water supplies. Until the smoke nuisance is really abated, we cannot get the full share of sunlight to which we are entitled, and the value of which was described by Norman Davey in the following words:

> The sun is the great dispeller of ill-humours. He is the healer, the life-bringer. He is the only true doctor to the troubled mind. He is the best apothecary in the world. There is no tonic sold for gold over any chemist's counter so remedial as that celestial pick-me-up, which is poured for nothing at daybreak over the wide counter which is the rim of the earth.

Dr. Saleeby in his lecture last night showed by his wonderful slides the truth of Davey's description.

This Association and its members have done more practical work than any other agency in the country towards the reduction of smoke in the atmosphere. Are there not now in the country at least 12 million gas cookers, fires, and water heaters? And the number is being enormously increased every year. These have made a great difference to the atmosphere in our towns; and it is through the Association and its members, by their co-operative propaganda, that this result has been brought about. In Housing Schemes great strides have been made in persuading builders to put in a larger proportion of gas appliances than ever before.

In reference to housing, I would suggest that one of the lines which needs further development by the Association is the supply of hot water. Most people are beginning to take an interest in the way in which they can obtain hot water easily and economically. Many feel that the subject is complicated; but they are seeking for knowledge and advice. The Association can assist in making it clear that in some cases gas, and in others coke, is the most suitable fuel; and by interchange of information and experience among salesmen, they will be in a better position to advise the individual consumer as to which will be best in his own interest. We all sell both gas and coke, and the sale of the latter needs developing.

Educating the Salesman.

May I here refer to the admirable work the Association is carrying out in the Salesmen's Circles? These circles were instituted for the purpose of educating salesmen through the interchange of ideas and views. I had the pleasure of attending the annual gathering held this year at Birmingham, and was struck by the universal enthusiasm in the work of the Circles spoken of by the Chairmen of the various districts in their reports.

In regard to our work in connection with the education of salesmen, I should like to make a suggestion for your consideration. Though I am aware of the good work being done by the Education Scheme of the Institution of Gas Engineers, the Industrial Salesmen's Circles, and other agencies, and also the fine research work that is being carried out by many of the makers of gas apparatus, I would suggest that the industry, through this Association, might with advantage consider the question of training a certain number of special men for propaganda and salesmanship—more particularly with regard to the use and application of gas in the industrial sphere.

Studying the Consumer.

On the domestic side of our business, we have already done much the sort of thing I have in mind. We have studied the fuel problem from the consumer's end, where we recognize that it is in reality not a fuel problem at all, but a problem of health and housing and domestic economics, and so on. The problems of the woman in the home, in health and sickness; of the child in nursery and hospital, school and sanatorium; of the architect or town planner; of the builder or housing engineer, have been studied in the light of the theory and practice of general, social, and domestic science. We have employed experts on social conditions, and we have acquired the right to say that gas is the fuel of the future in this sphere, in the light, not of our knowledge of gas fire construction and design, but of our study and appreciation of the public's present and future needs. I think there is a case for the same kind of policy in regard to industry. There is a gap at present between ourselves and industry, which it is for us to bridge.

Grasping Industrial Problems.

Fuel technology and economy has perhaps not received from all manufacturers the consideration it deserves; but on the other side we in the gas industry, while not lacking experts in the technique of the gas furnace, do not, speaking generally, study and understand at all thoroughly the problems and requirements of the industries we ought to serve. Apart from the study of the existing processes in different industries, there are the much larger and broader questions of distribution and sale, industrial finance, applied science, and economics. Men who can envisage such matters in various industries are required to complete the effectiveness of our salesmanship. It seems to me doubtful whether the type of training required to produce these men exists.

Industrial Salesmanship.

At present our industrial salesmanship is largely confined to working from the gas industry outwards—knowing what gas can do first, and discovering what has to be done afterwards. We want men to work as much, though not exclusively, in the opposite direction—knowing the industries and their problems well, and then finding in the gas industry afterwards the solution of those industries' needs. The Birmingham Industrial Gas Department is, in a small way, but very ably, attempting something on the lines suggested, with good results.

I would suggest that the industry might offer scholarships at the older or newer universities, or both, for the training of the sort of men required. Perhaps the Executive Committee of the Association will think it worth while to give the matter its careful consideration, and to work out a scheme.

Friendly Competition.

We in this district, as many of you are aware, are in an electric super-power station area, and we have had very formidable competition to meet. I am glad to say the competition has been friendly. We do not decry each other, and we each, I think, admit that we have not a monopoly of advantages in all circumstances. I hope our Association will always be on similar terms with the British Electrical Development Association. In passing through this very severe competition—which some of you may yet have to encounter—we have found the publicity work of the "B.C.G.A." of very great value.

Publicity: The Value of the "B.C.G.A."

During the period of my Presidency I have naturally been in closer touch than I was previously with the work of the Association. I have seen more of the great work it does and of the value of that work; and as a result I am more firmly convinced than ever of the great benefit the Association is to the industry. I am also convinced that an increased income would give proportionately greater beneficial results. There would be practically no increase in standing charges, and therefore the whole of the extra money would go in direct publicity work. The gas industry could not have reached the greatly improved position it now holds, either in the eyes of the public or in its increased sales, but for the past work of this Association; and that work has from the beginning been inspired and directed by the Executive Chairman of the Association, Mr. F. W. Goodenough, C.B.E., to whom the members owe a deep debt of gratitude.

A Note of Optimism.

Let me, in conclusion, just say one word to the public who hold gas stocks and shares, for they are the people to whom we largely look for capital to carry on and develop in the future. The recent boost that the electrical industry has received from Government action has made some holders of gas stocks nervous, and consequently the market price of many of our stocks and shares is lower than it should be. In my opinion that is a reason for buying, not for selling. At any rate, I personally have acted on that principle.

There have been occasions in the past when the public has thought that electricity would supersede gas entirely, instead of which the gas industry has been stirred to fresh activities, with the result that its progress is really amazing.

Last year 40 p.ct. more gas was consumed in Great Britain than before the war, in spite of the industrial depression. There are now over 8¾ million consumers—that is to say that practically every family in the areas supplied by gas is using gas for some purpose or other—while 20,000 industrial processes are operated with gas. In Newcastle 97 p.ct. of the doctors use gas fires; and the Harley Street area of London shows one of the highest consumptions of gas for any residential district. Similar figures will, I think, be found to apply to the whole country.

Are these the signs of a moribund or decadent industry? Are they not rather the signs of an up-to-date and progressive industry, the future of which I venture to say is as bright to-day as it ever was in its history?

INAUGURATION OF GLOVER-WEST VERTICALS AT MIDDLETON.

VISITORS AT THE MIDDLETON WORKS ON THE OCCASION OF THE INAUGURATION OF THE NEW VERTICAL RETORTS.

Middleton, a progressive borough on the border of Manchester, and with Rochdale and Oldham as near neighbours, has just completed the installation of additional gas plant, which it is anticipated will meet its constantly increasing requirements for many years. The installation was formally set going on Thursday, Oct. 22, in the presence of a large assembly of public men and gas engineers. The Middleton Works are of long standing; and the addition just inaugurated consists of vertical retorts. Those present included Councillor A. H. Hollingworth (Mayor of Middleton), Alderman Hilton (Chairman of the Middleton Gas Committee), and nearly all the members of the Corporation, as well as Alderman F. J. West, ex-Lord Mayor of Manchester.

Engineer's Opinion of the Plant.

The company were conducted over the gas-works; and the various processes were explained in detail to them. The mechanism was set in motion by the Mayor and others. It was remarked by the Engineer (Mr. William Rogerson) that the new plant had behind it the experience of a firm responsible for the construction of 6000 similar retorts—put into operation within the past fifteen years in all parts of the world, and producing 350 million c.ft. of gas daily. In commending the new system, Mr. Rogerson said: "The plant is now at work, and fully justifies the change made. It has proved itself highly satisfactory and efficient in every respect, and has greatly improved the working conditions of the men and the cleanliness of the works and surrounding atmosphere. The large volume of steam and smoke usually associated with a gas-works has completely disappeared. I am confident that a full year's working with this plant will prove the wisdom of its adoption, and lead to a reduction in the price of gas."

Luncheon Toasts.

Following a luncheon at the Assheton Arms Hotel, Alderman West proposed the toast of "The Town and Trade of Middleton." He referred to the general lack of knowledge on the part of ratepayers with regard to the amount of work done on their behalf by the members of a corporation. If the public possessed a little knowledge of the service rendered, there would be less disposition to criticize.

The toast of "The Middleton Gas Undertaking" was submitted by Mr. S. Glover, who replied to the Mayor's facetious observations. If people asked where Middleton was, he (Mr. Glover) would answer that it held an important position not only so far as its Council was concerned, but because of its gas undertaking. It had provided Oldham with a Gas Engineer in Mr. Duxbury. The Middleton Gas Committee was a very progressive one; and he wished to congratulate them on the splendid service they were performing on behalf of the ratepayers of the district. When he considered the price of coal and the difficulties that the Committee had to contend with, he could not but compliment them upon the splendid position they managed to retain in the gas industry.

Alderman Hilton, who responded, said the Committee had not attained their position without a good deal of hard work. They were producing gas at present at practically pre-war prices. The town was very well satisfied with its new system. He had been on the Gas Committee for seventeen years, and had seen the awful conditions under which the men they employed had formerly to work. Now the conditions were considerably improved. In fact, a man could work in the Middleton Gas-Works in his Sunday clothes. He paid a tribute to the skill and foresight of Mr. Rogerson, who had so ably advised them.

Councillor Smith proposed "The Contractors," and said the Committee placed the order after making sure that the firm engaged had done good work and had a reputation to live up to. Every credit and praise was due, and must be given, to the contractors for the excellent way they had carried on and completed the work. The Corporation had every confidence in the plant, and felt assured the future would justify the selection of the plant and the contractors who supplied and erected it.

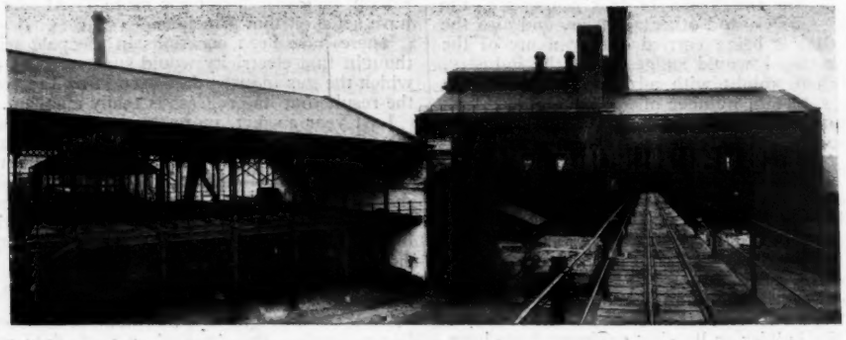
Replying, Mr. Ernest West said they had encountered many difficulties while installing the new system; but with the kind assistance of the Middleton gas officials, they had easily overcome them. Mr. West then presented Alderman Hilton with a solid silver cigarette case, as a memento of the occasion.

Mr. Duxbury responded to the toast on behalf of the visitors, and declared that the eleven years he spent at Middleton were among the happiest in his life. The Middleton councillors had always proved themselves pioneers. They were the first to experiment with inclined retorts. In Oldham they had had vertical retorts, such as Middleton now had, for the past thirteen years.

Mr. Rogerson briefly thanked all who had spoken in praise of himself.

NEW PLANT DESCRIBED.

The Middleton Gas Company was incorporated by Act of Parliament in 1846, with a capital of £5000 and power to raise another £5000 on mortgage. It was authorized to make and supply gas in the townships of Middleton and Tonge. This



GENERAL VIEW OF THE MIDDLETON WORKS.

Company was re-formed under the Middleton Gas Act of 1854, and under the same name. The new Company inherited all the authorities and properties of the original Company, with powers to raise a further £10,000 and to borrow not more than one-third part of the paid-up capital.

By the Middleton and Tonge Improvement Act of 1861, Town Commissioners were appointed who purchased and acquired the undertaking on Oct. 1, 1861. Annuities of £1 and 16s. each were created by the Act in substitution for the shares. The Commissioners were succeeded by the Middleton Town Council in 1886. The Council was authorized by the Middleton Corporation Act of 1910 to redeem these annuities after Jan. 1, 1940, on payment of their full value at that date.

The Act of 1861 fixed the maximum price for the sale of gas at 5s. per 1000 c.ft., and extended the area of supply to include the township of Thornham, together with the townships of Alkrington, Great Heaton, and Little Heaton, in the parish of Prestwich-cum-Oldham.

Carbonizing Plant.

The gas-works is situated off Townley Street. The carbonizing plant consists of a retort house building originally designed for inclined retorts, which have been replaced by an installation of Glover-West verticals, constructed by West's Gas Improvement Company, Ltd., of Manchester, for a daily capacity of 750,000 c.ft. The extension now in hand will give a further capacity of 375,000 c.ft. per day.

There is covered storage for 1000 tons of coal in the store adjacent to the retort house, and for a further 1000 tons in the open, in addition to the coal sufficient for 48 hours' gas-making provided in the bunkers above the retorts.

From the carbonizing plant the crude gas passes to the condensing plant, consisting of a vertical water-tube condenser designed for a daily capacity of 1 million c.ft. Between the retorts and the condenser the gas passes through some 300 yards of mains, which add materially to the capacity and efficiency of the condensing plant.

The exhausters are placed in the engine house erected during the current year. The existing plant has been thoroughly overhauled; two new machines having been installed. It is confidently anticipated that it will meet all requirements for at least fifteen years.

Purification.

The wet purification plant consists of a Livesey washer for the abstraction of ammonia from the gas, with a daily capacity of 1 million c.ft. A tar scrubber and a rotary washer are also used for later stages of the same process. Sulphate of ammonia is manufactured in a plant capable of making 30 cwt. of salt per diem. Dry purification is effected in a series of four cast-iron boxes, 30 ft. by 20 ft. by 5 ft. deep, to which were added two years ago two further boxes, 30 ft. square by 5 ft. deep. The new boxes are of the latest type, and the whole plant has been rebuilt, brought up to date, and put into first-class condition, so that it is capable of dealing with all expected developments for the next twenty years. Elevating machinery is provided for handling the revivified oxide.

Storage.

The works is provided with three gasholders of a combined capacity of 685,000 c.ft. The total storage capacity is less than one day's demand, which has risen to a maximum of 875,000 c.ft. The governor house contains three 15-in. governors for the control of supply to the districts of Middleton, Tonge, and Rhodes respectively—three of the latest double-valve type having been installed about five years ago by Messrs. J. & J. Braddock, of Oldham.

General.

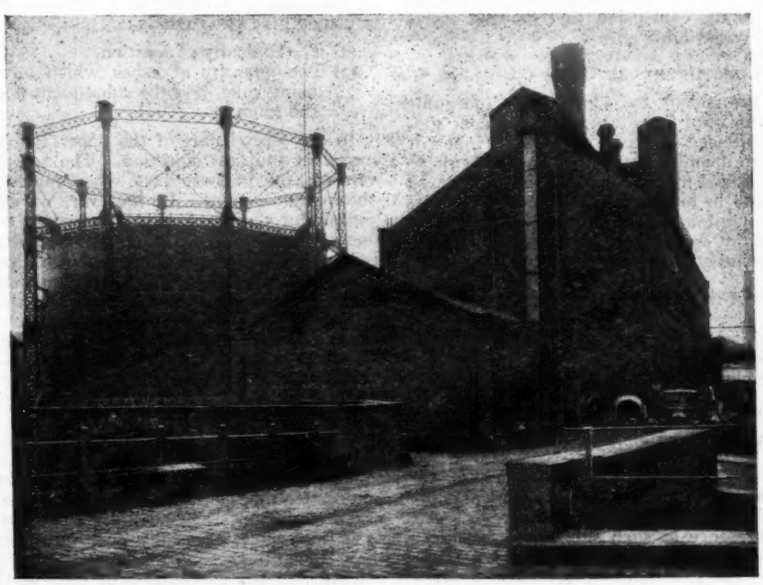
The works is equipped with all appliances necessary for economical gas-making. Among these may be mentioned a pan-ash washer for the recovery of combustible fuel from the ashes taken from the furnaces of the retort settings and boilers. About 40 p.ct. of the pan ashes is found to be fuel usable under boilers; and in two years the ingenious plant had paid for itself.

Reading left to right:—Mr. W. Rogerson, Engineer and Manager, Alderman F. J. West, C.B.E., Alderman A. Hilton, Chairman of the Gas Committee, His Worship the Mayor of Middleton (Councillor A. H. Hollingworth), Councillor J. Smith, Vice-Chairman of the Committee, and Mr. Ernest West.

In the meter shop, a staff of experienced meter-makers are regularly employed in the repair and testing of consumers' meters. Boilers, pumps, tar and water tanks, workshops, and garage complete a gas-works which, it is affirmed, is one of the most fully equipped of its size in the kingdom. The low price of gas and the satisfactory service rendered are the principal factors in the rapid and constant growth of the demand for gas in the Middleton area; and there is no doubt that this expansion will continue for many years to come.

Glover-West Installation.

The type of retort installed at Middleton is known as the 40-in. "New Model." It is the type now in operation in several large gas-works, and in course of construction in the new Partington Works of the Manchester Corporation. The Middleton installation comprises twelve retorts built in 1925 for a production of 750,000 c.ft. of gas per diem. Arrangements were then made for subsequent extensions, which are now in hand. They comprise six retorts in the first instalment, with provision for another six to be erected in the near future. When the whole scheme is carried out, the complete installation will be capable of a production of 1½ million c.ft. of gas per diem. Coal



VIEW SHOWING ALTERATIONS TO INCLINED RETORT-HOUSE TO ACCOMMODATE THE VERTICAL RETORTS.

is brought to the works in road vehicles, and tipped into a receiving hopper in the floor of the coal store. From this it is fed mechanically into a breaker capable of reducing 25 tons of large coal per hour to a size convenient for the carbonizing plant. The broken coal is received by a West's lip-bucket conveyor, which elevates and distributes it in bunkers above the retort bench capable of containing a 48 hours' supply.

Coke Handling Plant.

The coke is directed straight to the buckets of the conveyor by means of a travelling guide shoot, and the conveyor elevates it to a position above the retort bench, from which it is automatically discharged into a shoot fitted with a bag-filling shoot to supply coke for the retorts after scurfing. The main shoot directs the remainder of the coke to the storage hoppers. These hoppers are fitted with bar screens to separate out the breeze and also to form the bottom of two intermediate compartments. Each of these compartments is fitted with two outlets, one to feed coke direct to the producers, and the other to feed the surplus coke to wagons on the overhead gantry, and so to the yard store, or through a shoot into a small auxiliary hopper fitted to the outlet of the breeze compartment of the main storage hopper, where the breeze is fed into customers' vehicles outside the retort house. This small auxiliary hopper is fitted with a bar screen, and is really a miniature of the main storage hoppers.

The installation is equipped with an electrically-operated lift. This is fitted with rails, upon which side-tipping coal wagons can be run for auxiliary coal-feed to the overhead coal-storage bunkers.

Working Results.

Figures given in the report of the Gas Engineer and Manager for the year ended March 31, 1926, though they do not include a full year's working of the new vertical retort plant, indicate sufficiently that a considerable improvement has already been made in the results obtained in the works.

As compared with 1925, the make per ton of coal carbonized was increased from 14,646 to 15,825 c.ft., and the undertaking shows a net profit of £2354, as against £469 in 1925, without any increase in the price charged for gas.

The Engineer and Manager sums up that portion of his report which deals with the carbonizing plant in the following words:

> The plant is now at work, and fully justifies the change made. It has proved itself highly satisfactory and efficient in every respect, and has greatly improved the working conditions of the men and the cleanliness of the works and surrounding atmosphere. The large volume of steam and smoke usually associated with a gas-works has completely disappeared. I am confident that a full year's working with this plant will prove the wisdom of its adoption, and lead to a reduction in the price of gas.

SCOTTISH JUNIOR GAS ASSOCIATION (EASTERN DISTRICT).

The Opening Meeting of the twenty-third session of the Association was held at the Heriot Watt College, Edinburgh, on Saturday, Oct. 16.

Mr. A. McG. Clark (Port Glasgow), the retiring President, occupied the chair at the outset. He thanked the members for their support during his term of office, and Mr. Scobie, the late Hon. Secretary and Treasurer, for his help. He then introduced Mr. M. Darling (Cowdenbeath), the new President.

Mr. Darling, having taken the chair, presented Mr. A. McG. Clark with a Gold Medal, in recognition of his valued services during his presidency.

Mr. Clark replied.

The President, introducing Dr. C. B. Marson, of Leeds University, said that all in the gas industry appreciated the good work carried out by the Research Staff in the Department of Coal Gas and Fuel Industries at Leeds, under Prof. J. W. Cobb.

INFLUENCE OF THE ASH CONSTITUENTS IN THE CARBONIZATION AND GASIFICATION OF COAL.

By C. B. Marson, Ph.D., M.Sc., A.I.C.

When that complex substance which we know by the name of coal is carbonized, a large variety of chemical and physical reactions takes place; and in these the incombustible portion, usually termed the ash, undoubtedly plays an important part. I propose to examine the behaviour of the ash during carbonizing and gasifying processes. Some of these influences are obvious, and require little explanation; but there are other influences at work of which we know but little. Recently, however, the subject of ash has received more attention, and several investigators have come to the conclusion that the ash exerts large and, in some ways, remarkable effects.

Inorganic Constituents in Coal—

Let us first examine the means by which these inorganic constituents have originally been introduced into the coal substance. The ash may be divided into two classes—(1) inherent inorganic matter, fairly uniformly distributed and difficult to remove; (2) adventitious, mixed matter, such as slate, shale, or rock-like material occurring in faults, fissures, and dirt bands, or even arising from contamination in mining. This second class of ash is more readily separated. The presence of inorganic constituents in coal may be attributed to:

(1) The mineral content of the plants forming the coal.
(2) Animal remains.
(3) Mechanical contamination of the coal substance with clays, &c., during formation.
(4) Infiltrations from geological formations above and below the coal measures.
(5) Faults and fissures in the seam.
(6) Contamination with the material of the roof or floor of the mine.

This inorganic matter is made up of numerous chemical compounds, occurring in varying proportions in different coals. An ash analysis reveals the presence of such substances as silica, alumina, iron oxide, lime, magnesia, alkalis, &c.; and these exist in the coal either in the free form or combined as carbonates, sulphates, silicates, &c.

And Their Effects on Carbonization.

The more obvious effects of ash on the carbonizing processes are:

(1) The diluting effect. In every 100 tons of coal which we put through our retorts, there may be 10 tons, or even more, of ash.
(2) Its effect on the quality of the gas. The sulphur content of crude gas is largely derived from the iron pyrites present in the coal.
(3) The ash may reduce the strength of the coke, and so increase the quantity of breeze.
(4) The popularization of coke as a smokeless fuel partly depends on the quantity of ash present. It should always be remembered that the ash in 20 cwt. of coal is concentrated in 14 cwt. of coke.

Of recent years, the demand for a smokeless fuel for domestic purposes has increased. It is beginning to be realized that the burning of raw coal in the domestic fire contributes largely to the smoke nuisance in our cities; and naturally our thoughts turn to the project of producing a smokeless fuel by high or medium temperature carbonizing processes. These industries are established on a sound economic basis, they are equipped with the necessary plant, and adequate technical control and experience are available. Why, therefore, should they not cater for this demand for a smokeless fuel? They are in the best position to do so. In normal times, however, we frequently hear of undertakings who have difficulty in disposing of their coke—why?

The Housewife's Objections to Coke.

If the housewife is asked what are her objections to the use of gas coke in a dining or a drawing room fireplace, she will probably give two reasons:

(1) The difficulty of ignition.
(2) The quantity of ashes which have to be removed after using coke, and the subsequent dust which is deposited in the room.

In the second part of the paper I hope to deal with the removal of the first objection. The second objection becomes a very real one in these days, when domestic help is so difficult to obtain (and retain). If, however, we can manufacture a coke containing 5 p.ct. of ash, rather than the usual 12 p.ct., then one of the causes of its unpopularity as a domestic fuel will be removed. There are, even now, collieries which can supply coal containing only 2 to 3 p.ct. of ash; and if this coal could be segregated during carbonization, then the resulting coke would command a higher price. For some purposes, such as central heating and boiler firing, high-ash coke is less objectionable. Could we not have two qualities of coke—(1) the more expensive low-ash coke, intended to be used in open firegrates, and (2) the less expensive high-ash variety, for use in central heating appliances, &c. Under present conditions, coals high or low in ash are indiscriminately mixed; and even if they are segregated, as they are in some of the large undertakings, the customer pays just as much for coke containing 20 p.ct. of ash as he does for that containing 5 p.ct. Undoubtedly there would be practical difficulties in adopting such a method of segregation. Is it impossible, especially in large undertakings, to overcome these difficulties?

Lastly, in the gasification of coke in the water gas process, high ash may result in greater clinkering difficulties. Further-

more, the greater the ash content of the coke, the greater will be the tendency for unburnt carbon to remain in the clinker.

GAS FELLOWSHIP WORK.

Let us now consider the less obvious influences of the ash—influences which Prof. Cobb and I have been investigating for the past two years. It is known that coal ash contains compounds of great chemical activity, such as iron oxide; and it is therefore feasible to suppose that this activity may make itself felt when coal containing ash is carbonized or gasified. The system we adopted was to make 5 p.ct. additions of typical ash constituents, such as silica, lime, alumina, iron oxide, &c., to a coal containing originally less than 1 p.ct. of ash. To ensure intimate mixing, finely ground coal was used, and the substances themselves were added in a state of fine division. The prepared mixtures were carbonized in the laboratory, some cokes being prepared at a temperature of 500° C., and others at 800° C. By this means we succeeded in obtaining a coke which contained one known ash constituent in dominating quantity, thus facilitating the detection of any changes brought about by the addition. As a standard, we carbonized a quantity of the untreated coal; and this coke (referred to as the "pure" coke) was examined in the same way as the special cokes.

The most remarkable changes in the physical character of the cokes were brought about by the additions of iron oxide and sodium carbonate. The "pure" coke was very spongy and swollen, whereas the cokes containing iron oxide and sodium carbonate were homogeneous, compact, and finely porous. Additions of silica, alumina, lime, and calcium carbonate made no apparent difference in the appearance of the coke, but the addition of caustic soda completely destroyed the coking quality of the coal, in marked contrast to the effect observed with sodium carbonate. The crushing strengths of the cokes (which are given in Table I.) showed wide variations, but it was possible to draw the conclusions that the crushing strength had been more than doubled all round by raising the temperature of carbonization from 500° C. to 800° C., and that the strength had been raised by the addition of iron oxide in both 500° C. and 800° C. carbonizations, and raised very much more by the addition of sodium carbonate, again at both temperatures of carbonization.

TABLE I.

Description.	Crushing Strengths in Lbs. per Sq. In.	
	500° C. Samples.	800° C. Samples.
"Pure" coke	530	1500
Silica ,,	460	1270
Alumina ,,	560	1270
Calcium oxide coke	550	1400
Iron oxide coke	700	1970
Sodium carbonate coke	1210	2980

The effect of the added compounds on the amount of sulphur left in the coke is shown in Table II., where it will be seen that iron oxide, lime, and alkalis all increased the amount of sulphur retained by the 800° C. cokes, while the other additions exerted very little effect.

TABLE II.

Sulphur Content of 800° C. Cokes.

Description.	P.Ct. Sulphur.
"Pure" coke	0·61
Silica ,,	0·63
Alumina ,,	0·60
Calcium oxide coke	1·07
Calcium carbonate coke	0·70
Iron oxide coke	1·06
Sodium carbonate coke	0·80
Sodium hydrate coke	0·99

It was also found that in some cases the amount of nitrogen retained by the coke had been influenced by the added compounds. Iron oxide and, less decisively, lime and calcium carbonate lessened the amount of nitrogen left in the cokes prepared at 800° C., while sodium hydrate and carbonate increased it.

TABLE III.

Description.	P.Ct. Nitrogen.
"Pure" coke	1·91
Iron oxide coke	1·35
Calcium oxide coke	1·76
Sodium carbonate coke	2·40
Sodium hydrate coke	2·36

We further examined the effect of these additions by passing a current of steam over the cokes at a temperature of 1000° C., and noting the amount of steam decomposed and the quality of the water gas produced. Here again, remarkable differences were observed; and these may be summarized in the following manner. (The temperature of gasification and the rate of steam supply are the same in each experiment.)

TABLE IV.

Description.	P.Ct. Steam Decomposed.	P.Ct. CO_2 in Water Gas.
"Pure" coke	61	9·2
5 p.ct. calcium oxide coke	82	5·4
5 ,, iron oxide coke	91	2·6
5 ,, sodium oxide (as Na_2CO_3) coke	98	0·4

In some later experiments, it was found that smaller quantities than 5 p.ct. additions exercised a pronounced effect—as little as 1 p.ct. of iron oxide and sodium carbonate, equivalent to ½ p.ct. of Na_2O, increasing the amount of steam decomposed, and lowering the amount of carbon dioxide in the water gas made.

Additions of silica, alumina, and fireclay produced no marked differences as compared with the "pure" coke, when these cokes were gasified in steam, so that we may regard silica, alumina, and fireclay as comparatively inert ash constituents, apart from their diluting effect.

Another interesting experiment was that in which a quantity of the "pure" coke was impregnated with alkali, by boiling it in a dilute solution of sodium carbonate, which imparted to the impregnated coke an increased reactivity. This suggests that it is some chemical effect of the sodium carbonate, rather than the finer grained structure, which is responsible for the increased reactivity of this coke.

The influence of the inorganic ash constituents on the steam-carbon reaction having been demonstrated, their influence on the carbon-carbon dioxide reaction was deemed to be worthy of consideration. We are indebted to Mr. W. R. Branson, B.Sc., who carried out a number of preliminary experiments, in which a constant stream of carbon dioxide was passed over a column of coke heated to a temperature of 850° C. The results obtained were remarkable, inasmuch as differences in the behaviour of the special cokes were much more emphasized, as the following table shows.

TABLE V.

Rate of CO_2—6 Litres per Hour.

Description.	P.Ct. CO in Gas.
"Pure" coke	6·6
Iron oxide coke	29·9
Calcium oxide coke	45·6
Sodium carbonate coke	89·0
Impregnated sodium carbonate coke	69·8

CONCLUSIONS.

These experiments show that there are certain ash constituents which will exert useful influences when coal is carbonized and gasified, while there are other constituents which are comparatively inert, and function only as diluting impurities. It is also evident that it is possible to obtain a coke with a hign ash content which is more reactive than a coke with a low ash content, providing that there are sufficient quantities of the reactive ash constituents in the high-ash coal. Thus we see that for some purposes a very low ash coal may not be most desirable. In the main, however, utilization of a naturally high ash coal is undesirable, for the reason postulated in the first part of this paper.

The remarkable results obtained by the addition of these inorganic compounds justify the expenditure of further research work in this direction, because it may even be desirable to increase the ash of coal artificially, as a means of influencing the reactivity and ease of ignition of the resulting coke.

Bearing in mind the disadvantages of high ash, mentioned in the first part of the paper, this proposal on the face of it appears to be somewhat paradoxical, but the important point is that, no matter how we treat coal before carbonization, we must keep the ash low in the coke. If we are going to add compounds before carbonization, then a coal with a low ash is absolutely essential. Let us consider for a moment what effect an artificially increased reactive ash would have on a coke which was to be used in an open fire. It is highly probable that, in spite of the blanketing action which might be caused by the ash, and interference with the radiant efficiency of the fire, there would be a compensation due to the increased combustibility of the coke and its ease of ignition.

The whole of this work is still at the experimental laboratory stage, and there are many points to be cleared up before we can adopt such revolutionary methods in the carbonizing processes. It does seem, however, to indicate a possible method of improving the quality of gas-works coke; and if we can succeed in doing this, then we shall have contributed in no small degree to the solution of the smoke problem of our large cities.

A hearty vote of thanks was accorded Dr. Marson; and the proceedings terminated.

MIDLAND JUNIOR GAS ASSOCIATION.

A Meeting of the Association was held on Thursday evening, Oct. 21, at the Council House, Birmingham. There was an attendance which numbered 50, and included Mr. F. C. Briggs (the President of the Midland Senior Association) and Mr. Leslie Wilson, a former member, who (it was stated from the chair at the outset by Mr. J. H. Gee, the retiring President) read a paper before the Junior Association twenty years ago.

Mr. Gee, in extending a cordial welcome to Mr. Briggs, pointed out that it was due to the Senior Association that the junior body came into being in 1905. For many years members of the Senior Association had supported them by their presence and encouragement; and it was gratifying to find, after 21 years' existence, the President of the Senior Association with them. Asking Mr. C. F. Tooby, of Coventry, to take the chair, Mr. Gee bore testimony to that gentleman's enthusiastic interest on behalf of the Association over a long period. He was one of those who joined in 1905. In 1914 he contributed a paper on the then new vertical retorts at the Windsor Street Works, Birmingham, and in 1920 another paper on "Carbonization." As a former member of the Birmingham staff, they were able to appreciate his able services.

Mr. Tooby then took the chair, having a hearty reception; and, in proposing a vote of thanks to Mr. Gee, he stated that the Association were much indebted to him for his useful services at the meetings of the members and of the Council. To him was due in large measure the acknowledged success of the last session. ["Hear, hear."]

The resolution was seconded by Mr. H. R. Hems (who this year became Senior Vice-President, with Mr. Caudwell, of Shrewsbury, as Junior Vice-President). He spoke of Mr. Gee's unassuming personality, and of the enthusiasm he showed in the arrangement of the programme for the session, and later in carrying it out.

Mr. Gee, in reply, said he was encouraged to know that his work, for which he felt no thanks were needed, had given satisfaction.

PRESIDENTIAL ADDRESS

OF

Charles F. Tooby, A.M.I.Mech.E., Works Manager,

Coventry Gas Department.

In the first place, I wish to thank the Association for the honour which it has conferred upon me by electing me President for the year. Last session marked the completion of 21 years of useful work by this Association; and I am anxious that the high standard of achievement shall be maintained during my term of office. Success in this respect depends on the amount of support which the members give. Therefore, I appeal to all to attend the meetings, and, if possible, take part in the discussions.

The stress and strain occasioned by the general strike and the prolonged coal strike have been felt by most of us, but more especially, I think, by those engaged on the management and engineering and works' sides; and this no doubt accounts for the fact that our programme is not so comprehensive as I wished it to be. However, I feel confident that in happier and less distracting times members on the engineering and manufacturing sides will come forward with papers, and thus give us the benefit of their experience and opinions.

The success of the industry depends largely on the soundness of its fundamental process—the carbonization of coal for the production of gas and bye-products, with all that this implies in structural engineering, mechanical handling of materials, and scientific control. Therefore it is important that our programme should include contributions in all these branches.

Education and Training.

The Education Scheme will undoubtedly have far-reaching effects in improving the standard of technical knowledge. It should be supplemented by systematic practical training; and in this connection chiefs of undertakings can assist greatly, by giving facilities for young juniors who show the necessary ability and will to learn, to obtain the widest possible experience.

Coventry Gas Undertaking.

The consumption of gas in Coventry is increasing at a remarkable rate. The annual make of gas has increased from 1154 million c.ft. for the year 1914-15 to 2322 millions for the year 1925-26, and the maximum daily output from 4·8 to 9·1 million c.ft. in the same period. This has necessitated a comprehensive scheme of extensions to the Foleshill Works.

In 1923 a complete new section capable of producing 2½ million c.ft. of straight coal gas per diem, or about 3 million c.ft. per diem when steaming, was completed and put into action. The section comprised Glover-West vertical retorts, with coal stores, coal and coke handling plant, condensers, turbo-exhausters, tar extractors, washing and scrubbing plant, &c. It was fully described in the "Journal" for Oct. 31, 1923, p. 313.

The retorts have worked very satisfactorily on a large variety of coals. Table 1 gives particulars of the carbonizing results obtained over a three-year period.

After about three years' working, some of the retorts began to give trouble, owing to roughness of the walls; and it was decided to cut out the affected portions of the troublesome ones, and rebuild, and to point up those which were still in good condition.

Table 2 gives particulars of the life of the retorts and of the repairs executed.

Table 2.—*No. 1 Installation Glover-West Vertical Retorts.*

Setting No.	Actual Days Gasmaking Prior to Repairs.	Additional Days on Slow Fire.	P.Ct. of Length of Retorts Rebuilt.	Other Repairs.
1	1063	51	31·3	Slight repairs to producer lining.
2	1107	7	31·3	,,
3	1154	5	39·0	,,
4	1163	4	31·3	,,
5	1176	11	39·0	,,
6	1178	9	48·0	,,
7	1242	8	47·0	,,
8	1243	19	38·0	,,
9	1236	51	30·0	,,

The cost of these repairs worked out at 4·5d. per ton of coal carbonized, or 0·056d. per therm. It is expected that a further life of at least two years will be obtained from the repaired retorts.

In the Glover-West system, the producer gas enters at one end only of the horizontal heating chambers, where it meets a stream of secondary air; a further supply of air being introduced half-way across the chamber. The object of the dual air supply is to obtain more regular heating of all the retorts. Nevertheless the temperatures in the chambers on the producer side are considerably higher than on the non-producer side. To counteract this, the coal throughput on the producer side retorts has to be maintained higher than on the other.

The higher temperatures and greater coal throughput have

Table 1.—*No. 1 Installation Glover-West Vertical Retorts, Foleshill Works.*

WORKING RESULTS.

Period Ended	Gas Made, C.Ft. (Corr.).	Coal Carbonized.	Gas Made per Ton of Coal.	C.V. of Gas, B.Th.U. per C.Ft.	Therms per Ton.	P.Ct. Steam to Retorts.	Coal per Retort per Diem. Tons.	Coke, Breeze, and Dust for Sale, Cwt. per Ton.	Coals in Use.	Tar, Gallons per Ton of Coal.	Liquor, Gallons 10 oz. per Ton of Coal.
June, 1923	263,001	16,525	15,915	491	78	15	2·45	9·4	S. Yorks. 56 p.ct. N. Staffs. 20 ,, Derbyshire 24 ,,	14·0	34·0
Sept., ,,	235,274	13,421	17,530	474	83	20	2·23				
Dec., ,,	256,687	14,195	18,083	462	84	20	2·25				
March, 1924	248,159	14,180	17,500	461	81	20	2·23				
June ,,	230,982	13,075	17·666	461	81	22	2·10	9·6	S. Yorks. 66 ,, N. Staffs. 9 ,, Derbyshire 25 ,,	15·6	37·9
Sept., ,,	235,844	14,076	16,755	466	78	21	2·28				
Dec., ,,	248,626	13,803	18,010	451	81	22	2·19				
March, 1925	251,515	13,666	18,404	445	82	21	2 20				
June, ,,	241,771	13,394	18,050	452	82	20	2·16	9·6	S. Yorks. 69 ,, N. Staffs. 6 ,, Derbyshire 25 ,,	17·6	36·4
Sept., ,,	218 439	12,663	17,250	455	78	19	2·05				
Dec. ,,	256,786	14,416	17,810	453	81	21	2·34				
March, 1926	247,504	13,889	17,813	457	81	23	2·27				

caused considerably more wear on these particular retorts. The affected portion was found to extend for about 12 ft. from a point 4 ft. down the retorts. This portion was cut out and rebuilt, and silica shield tiles were put in. The cooler retorts were found to be practically unaffected; and pointing up and washing with silica clay was all that was necessary.

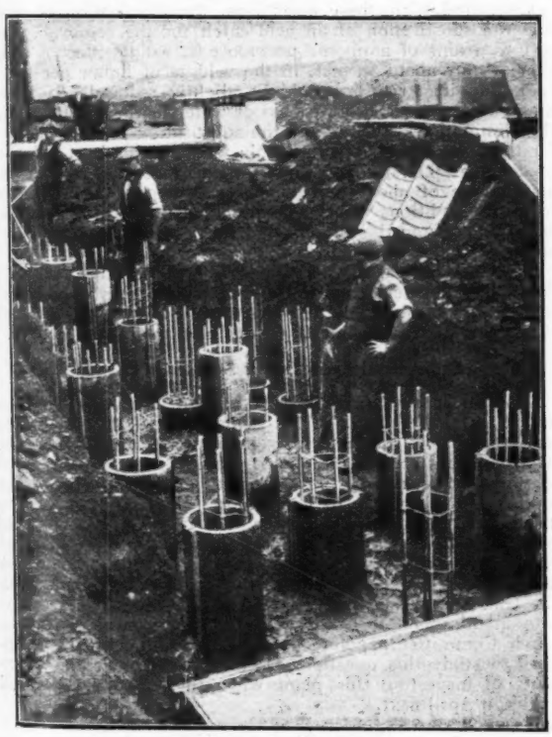
Further Extensions at the Foleshill Works.

In spite of recent extensions, it became necessary to increase the carbonizing plant still further; and early this year a contract was placed for five settings of Glover-West 40-in. retorts with coal stores. The plant will have a productive capacity of about 3½ million c.ft. of gas per diem when steaming. Additional water-tube condensers, purifiers, and a 5 million c.ft. gasholder are also being installed.

As was the case with the first installation of verticals, this installation has to be erected on made ground; and piling is necessary for the foundations. A short description of the special type of pile used, of which 376 have been driven on the site, may be of interest.

The pile, which is of the reinforced concrete shell type, is formed in the following manner. A pre-cast reinforced concrete driving shoe is placed on the spot where the pile is required. The pile-driving machine then lowers on to this a steel mandrel having an external helical thread throughout its length. The two halves of a pre-cast reinforced concrete cylindrical shell, about 2 ft. long, are then placed on the bottom portion of the mandrel next to the driving shoe. This hollow shell has an internal helical groove which fits the thread on the mandrel. It is held in position by wire clips.

By means of the usual falling weight, the mandrel is driven into the ground until the upper edge of the shell is level with

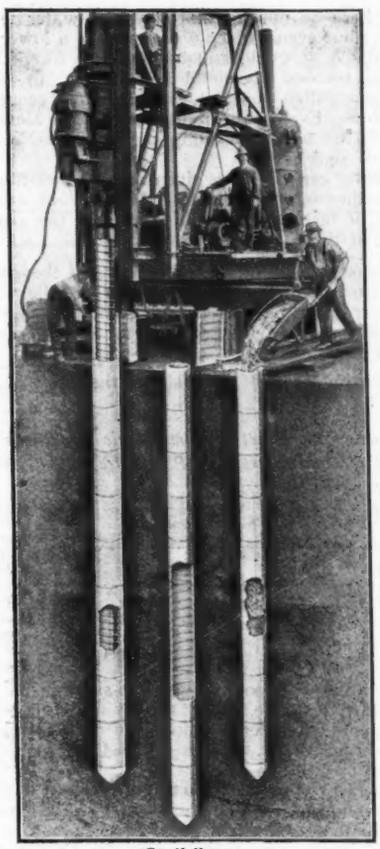


Group of Shell Piles.

the ground. Another shell is then placed in position on the mandrel, and the driving is continued. This process is continued until the required set of not more than 1½ in. for twelve blows from a 2-ton hammer falling through 3 ft. is obtained. The mandrel is then withdrawn by rotating it by an electric motor, and leaves a continuous hollow concrete shell in the ground. The reinforcements are lowered into it, and it is filled with concrete.

One of these piles, 29 ft. long and 13⅜ in. in diameter, was tested on the site by gradually loading, over a period of two months, up to 50 tons. No settlement took place, though pile-driving operations were in progress in the vicinity during most of the time. Some idea of the nature of the ground may be gathered from the fact that, in many cases, the mandrel, loaded simply with the weight of the hammer, sank quickly for a distance of several feet without any blows being struck. The illustrations show clearly the method of construction.

The chief advantage of the system is that one can inspect the interior of the driven shell from top to bottom by lowering into it an electric light, before concreting to form the core, thus ensuring absolute certainty of section of the pile.



Shell Piling.

Life of Horizontal Retorts.

After experience of two settings of horizontal retorts, built in "silco" material, which worked for 2300 days, it was decided to extend the use of this material; and now most of the horizontal retorts are made of it. Three of these settings have already worked for 1300 days, and are in excellent condition. Combustion chamber temperatures average about 1330° C. A trial setting of retorts in silica has also been in use for about two years, and gives promise of a long life.

In comparing the life of horizontal and vertical retorts, it is necessary to take into account the effective work done per sq.ft. of retort area. At Coventry the coal carbonized per sq.ft. of vertical retort area per diem when steaming is about 12 p.ct. more than the corresponding figure for horizontals, and the thermal yield in gas about 50 p.ct. more. On the basis of the thermal yield in gas, therefore, 1000 days' life of vertical retorts is equivalent to 1500 days of horizontal retorts.

Condensers.

The condensers in use on No. 1 section of vertical retorts are of the vertical water-tube type; the tubes being 1¾ in. outside diameter, 21 ft. long. The total tube area is 8400 sq.ft., for dealing with 2·9 million c.ft. of gas per diem when steaming to about 23 p.ct. on the retorts, equal to 2·9 sq.ft. of tube area per 1000 c.ft. of gas per diem.

At the time these condensers were installed, few data were available as to the tube area required for cooling gas from steamed vertical retorts. The tube area provided was found to be sufficient during winter, but considerably too small during hot weather. To estimate the area necessary for efficient condensation, I made a large number of tests on these condensers, under various conditions. From the results, I have concluded that, with this type of condenser, when steaming to 23 p.ct. with our normal coals, and continuous liquor circulation in the collecting and foul mains and water drawn from the canal, a tube area of 4·8 sq.ft. per 1000 c.ft. of gas per diem is necessary.

The conditions which may be expected in hot weather are set out in Table 3.

Table 3.—*Vertical Water-Tube Condensers.*

Approximate Temperature Conditions, &c., and Tube Area Required During Hot Weather.	
P.ct. steam to retorts on coal carbonized	23
Air temperature	80° Fahr.
Inlet water temperature	70° ,,
Outlet ,, ,,	145° ,,
Inlet gas ,,	170° ,,
Outlet ,, ,,	75° ,,
B.Th.U. to be absorbed by the water per c.ft. of gas	27·5
B.Th.U. absorbed per gallon of water	750
Tube area required per 1000 c.ft. of gas (corr.) per diem	4·8
Gallons of water per 1000 c.ft. of gas	36·7

It will here be noticed that the inlet water temperature is 70° Fahr.; but even if deep well water at a lower temperature were available, it would still be advisable to specify the same tube area, because it would be possible to absorb more B.Th.U. per gallon of water, with resultant economy in water consumption. Even when pumping charges alone have to be considered, the water consumption is a considerable item in the cost of condensing.

The cooling capacity of a given set of water-tube condensers in hot weather is strikingly less than in cold weather, due to a number of factors which all operate in the same direction. The chief of these are as follows:

(1) Increase in the initial temperature of the gas.
(2) Increase in the initial temperature of the water without a corresponding increase in its final temperature.
(3) Greatly reduced loss of heat to atmosphere by convection and radiation.

The following table of tests shows the effect of atmospheric conditions:

Table Showing the Effect of Atmospheric Conditions on Water-Tube Condensers. 20 P.Ct. Steam to Retorts.

Air Temperature ° Fahr.	Gas Temperature ° Fahr.		Water Temperature ° Fahr.		Gallons Water per Hour.	Gallons Water per 1000 C.Ft. of Gas.	B.Th.U. Absorbed by 1 Gallon of Water.
	In.	Out.	In.	Out.			
37	155	82	42	144	1420	12·8	1020
61	156½	68	54	137½	2410	20·2	840
80	170	91	75	136	3420	29·0	610

The tube area per 1000 c.ft. was the same in all the tests.

In the third test the water supply was full on, but even then it was not possible to reduce the outlet temperatures of the gas below 91° Fahr., and the B.Th.U. absorbed per gallon of water fell to 610.

It is generally understood that the horizontal tube type of water-tube condenser is more efficient than the vertical tube type; and in this connection it is instructive to compare results on the former type, obtained at the Dudley Gas-Works (as recorded by Mr. F. C. Briggs, A.M.Inst.C.E., in his presidential address to the Midland Association of Gas Engineers last March), with results obtained at the Foleshill Works on the vertical type. The following table gives details of the tests, which were made in cold weather.

Comparative Tests on Horizontal and Vertical Water-Tube Condensers Working on Gas from Vertical Retorts Steamed to 22 P.Ct. on the Coal Carbonized.

—	Dudley Tests. Horizontal Tube Condensers.		Foleshill. Vertical Tube Condensers.
	No. 2.	No. 3.	
Gas inlet temperature, ° Fahr. . . .	155	156	156
,, outlet ,, ,, . . .	63	64	62
Water inlet ,, ,, . . .	46	46	48
,, outlet ,, ,, . . .	137	136	139
Air ,, ,, . . .	44	44	48
Gallons of water per 1000 c.ft. of gas .	19·7	18·8	19·5
Tube area per 1000 c.ft. of gas per diem .	2·34	2·15	3·1
B.Th.U. absorbed by water per c.ft. of gas	18·0	17·0	17·8
K	18·2	17·3	15·3

K = transmission co-efficient = B.Th.U. taken up by the water per hour per sq. ft. of tube area per 1° Fahr. difference in mean temperature between gas and water.

Taking the mean of the two Dudley tests, it will be seen that with the horizontal tube type 2·24 sq.ft. of tube area did practically equivalent work to 3·1 sq.ft. in the vertical type. That is, the horizontal type required only 72 p.ct. of the area of the vertical type.

Therefore, for the hot weather conditions as set out in a previous table (No. 3), 4·8 × 0·72 = 3·46 sq.ft. of tube area per 1000 c.ft. of gas per diem is required for the horizontal tube condenser. This figure has been adopted for the horizontal condensers which are to be installed for the second installation of verticals.

Other particulars of these condensers are set out in the table at the top of the next column.

Tests show that when there is no continuous circulation of liquor in the collecting and foul mains, approximately 40 p.ct. additional work is thrown upon the condensers.

In the second installation of vertical retorts, the gas will be passed through a cyclone tar extractor before it enters the retort house governor; and plant will be provided for circulating cooled liquor rich in fixed ammonia through the collecting and foul mains, with the object of reducing the oxygen absorption factor of the waste liquor from the sulphate plant.

The tests set out in the table on p. 231 show the effect of liquor circulation in the collecting and foul mains on the work

Horizontal Water-Tube Condensers for 6 Million C.Ft. of Gas per Diem from Vertical Retorts Steamed to 23 P.Ct. on the Coal Carbonized. Hot Weather Conditions.

Details of Condensers.	Tube Area per 1000 C.Ft. of Gas per Diem.	Water Consumption. Gallons per 1000 C.Ft.	Difference between Inlet Gas Temp. and Outlet Water Temp.	Water Vel. through Tubes at 70° Fahr. Feet per Sec.	Gas Vel. Past Tubes at 170° Fahr.
columns each containing 20 sets of 84 each 2 in. ext. dia. by 8 ft. by ⅛ in. W.I. lap-welded boiler quality tubes	3·46	35	20	0·555	21·2

of the condensers. It will be noticed that when the circulation is in use there is a considerable reduction in the volume of liquor brought down in the condensers, and an increase in its strength. This is, of course, due to the fact that, when circulation is on, much weak liquor is condensed in the foul mains, and is drained away prior to the condensers.

Unfortunately, when steaming heavily in the retorts, a large quantity of weak liquor is unavoidably produced. At Foleshill the weak liquor is circulated through Livesey washers, and the final removal of ammonia from the gas is effected in a Holmes rotary scrubber using water. Working with a scrubber volume of 830 c.ft. per million c.ft. of gas per diem, and using water, it has been found possible to produce 20 oz. liquor in this scrubber, except during hot weather.

Compared with these conditions, the elimination of water and the substitution of an acid catch for the removal of the last 50 grains of ammonia per 100 c.ft. would effect a reduction of only about 13 p.ct. in the volume of liquor per ton of coal, and its strength would be slightly reduced. If 10 oz. liquor were produced by the use of water in the scrubber, then the elimination of water and the substitution of an acid catch for the last 50 grains of ammonia would result in a reduction of about 22 p.ct. in the volume of liquor per ton of coal, and an increase of about 7 p.ct. in its strength. These figures relate to conditions when steaming to about 23 p.ct., and are based on tests on the amount and strength of the virgin liquor produced, &c.

Of course, in cases where there is little or no steaming of the retorts, an acid catch for the last 50 grains of ammonia would effect a much greater percentage decrease in the volume of liquor made, and a much greater increase in its strength.

Effluent Liquor from Sulphate Plants.

A plant for the treatment of this liquor is now being installed at the Foleshill Works. This consists of four bacteria beds, each 120 ft. diameter by 5 ft. 6 in. deep, with the necessary revolving sprinklers, pumps, tanks, &c. Each bed will be constructed on a shallow concrete dish for the collection and draining-off of the treated liquor. The whole of the construction is being carried out by the Gas Department; and some idea of the initial difficulties involved may be gathered from the fact that about 30,000 cubic yards of earth and rock had to be excavated before construction could be commenced. The Gas Committee have granted permission for a series of tests on this plant to be made under the auspices of the Research Committee appointed by the Institution of Gas Engineers to study this question. Members will have the opportunity of inspecting this plant when they visit the Foleshill Works in April next.

Distribution Problems.

The whole of the gas for Coventry is produced at the Foleshill Works, which are situated about three miles from the centre of the city.

The gas is conveyed from the Foleshill holders through a 24-in. driving main to the holders at the old city works, for distribution. This driving main also feeds two districts *en route*, through high and low pressure governors. During the hours of low demand, the difference in pressures between the two sets of holders is sufficient to deliver the required volume; but during the daytime resort has to be made to boosting. One turbo-booster of 60 B.H.P. is capable of delivering 600,000 c.ft. per hour with an initial pressure of 30 in. water-gauge; and the other, a 300 B.H.P. set, 1 million c.ft. per hour with an initial pressure of 56 in. water-gauge in the main.

The heaviest demand coincides with cooking time, near mid-day, when for short periods the output reaches 750,000 c.ft. per hour. It is obvious that this main, which is of cast iron with run lead joints, will soon be working up to its safe capacity; and the question of a relief main, probably in the form of a high-pressure ring main, is under consideration. This, in addition to functioning as a relief main, would be utilized for reinforcing the supply in outlying districts, where

Condensation Tests on Water-Tube Condensers on Vertical Retort Installation at Foleshill Works.

No. of Test.	Liquor Circulation in Collecting and Foul Mains.	P.Ct. Net. Steam to Retorts.	Gas Temp. Inlet to Condensers. ° Fahr.	Products Condensed Prior to Inlet of Condensers. Galls. per Ton of Coal.		Products Removed by Condensers. Galls. per Ton of Coal.				Total Nos. I. and II. Condensers. Galls. per Ton of Coal.		Total Products Condensed up to Outlet of Condensers. Galls. per Ton of Coal.	
						No. I. Condenser.		No. II. Condenser.					
				Tar (Corr. to 5 P.Ct. Water).	Liquor.	Tar (Corr. to 5 P.Ct. Water).	Liquor.	Tar (Corr. to 5 P.Ct. Water).	Liquor.	Tar (Corr. to 5 P.Ct. Water).	Liquor.	Tar (Corr. to 5 P.Ct. Water).	Liquor.
1	*Nil*	23	180	12·0	3·6	3·4	29·9 Oz. str. = 2·39 Free NH_3 = 0·434 p.ct. Fixed NH_3 = 0·085 p.ct.	2·5	15·0 Oz. str. = 9·48 Free NH_3 = 2·00 p.ct. Fixed NH_3 = 0·06 p.ct.	5·9	44·9 Oz. str. = 4·76	17·9	48·5
2	40 galls. per ton (approx.)	23	167	Not measured. Removed with circulating liquor.		2·2	19·4 Oz. str. = 3·13 Free NH_3 = 0·53 p.ct. Fixed NH_3 = 0·15 p.ct.	3·3	11·1 Oz. str. = 11·40 Free NH_3 = 2·40 p.ct. Fixed NH_3 = 0·08 p.ct.	5·5	30·5 Oz. str. = 6·14	..	..
3	*Nil*	20½	177	Not measured.		..	..	..	..	3·9	40·0 Oz. str. = 5·21 Free NH_3 = 1·03 p.ct. Fixed NH_3 = 0·10 p.ct.	..	..
4	40 galls. per ton (approx.)	20½	161	Not measured. Removed with circulating liquor.		..	..	..	..	1·5	27 7 Oz. str. = 7·42 Free NH_3 = 1 49 p.ct. Fixed NH_3 = 0 12 p.ct.	..	..
5	*Nil*	18	173	12·4	4·5	3·0	27·2 Oz. str. = 3·06 Free NH_3 = 0·52 p.ct. Fixed NH_3 = 0·12 p.ct.	0·7	12·0 Oz. str. = 11·04 Free NH_3 = 2·33 p.ct. Fixed NH_3 = 0·06 p.ct.	3·7	39·2 Oz. str. = 5·50	16·1	43·7

the mains are being continually extended to meet the requirements of a rapidly-growing city.

NEED FOR INDIVIDUAL EFFORT.

One of the most striking features of the technical literature of the gas industry to-day is the publication of the results of a large amount of centrally-organized scientific research on processes of manufacture, as carried out by highly-trained scientists. These are of great value in that they make known a vast quantity of exact data concerning the results which can be obtained by various kinds of plant, and thus clear the ground for further advance. This type of work is essential. There is, however, in my opinion, one danger which may possibly result from it, and it is that juniors may think that it lessens the necessity for individual effort and initiative on their part in solving the problems of manufacture. Few are capable of conducting highly scientific research; but apart from this, there is a tremendous field wherein personal initiative can achieve much.

I will quote one instance only. Vertical retorts, which carbonize such a large percentage of the coal used on gas-works, were evolved not so much as a result of scientific research, but as the result of the imagination and individual efforts of a few pioneers, who, having conceived an idea, proceeded to express it in a practical working plant.

In conclusion, I wish to thank my Chief, Mr. P. N. Langford, the Engineer and General Manager of the Coventry Gas Department, for permission to publish the figures given in this address.

Mr. BRIGGS, in moving a vote of thanks to Mr. Tooby for his address, congratulated the Association upon having completed 21 years of existence. In Mr. Tooby they had a capable President, who at various times had contributed a lot of technical information of great value to the industry. It was by such contributions that those in the industry were able to arrive at a sound judgment. He fully agreed as to the importance of the juniors grappling with practical problems and "pointing the way." There was, in his judgment, great necessity for a clearing house for all information of this kind, in order that it might be correlated. Incidentally, it would minimize, if not prevent, overlapping.

Mr. W. J. PICKERING (Birmingham) seconding, observed that Mr. Tooby and himself entered the gas industry within a few months of each other. Mr. Tooby, when on the Birmingham staff, was held in the highest esteem. He complimented him upon the excellent figures he had obtained at the Coventry works, and particularly in relation to condensing practice. He agreed as to the need for individual effort.

Coffee was served at the invitation of the President, and later the members inspected, with much interest, a number of scientific instruments arranged in the adjoining laboratory by Mr. Harry Astbury, by the courtesy of the Cambridge Instrument Company.

Examination of Coking Coals.

The methods of investigating coking coals—crucible test, distillation behaviour, and coking power, and coke density, porosity, and friability—are discussed by R. Kattwinkel in the August issue of "Fuel in Science and Practice." These methods, he suggests, are suitable for the classification of coals, but do not afford a sufficient explanation of the production of coke in industrial plants. The theories derived from a study of the behaviour of coals on crucible carbonization—such as the theory of Fischer—fail partially, for on an industrial scale carbonization conditions are realized which cannot be reproduced in a crucible. In particular the transference of heat in crucible carbonization is much more rapid than in large-scale practice. Fischer's theory—the result of work by Fischer, Broche, and Strache—referred to above is of considerable interest. These investigators have isolated and examined the constituents causing coking and swelling in a series of coals ranging from the geologically young coals, through lignitious, bituminous, and carbonaceous coals to the geologically oldest coal, anthracite. They have shown by crucible tests that the divergent behaviour of coals during carbonization is due to certain properties of their "bitumen." Coals with solid and hard bitumen—sand or sinter coals—give no fused coke, at most producing a sintered or slightly-caked coke; while coals with soft and plastic bitumen—caking and swelling coals—give rise to a fused and swollen coke. The bitumen consists of two chemically different portions, one of which is solid, and the other mobile. The solid oxygenated portion has different temperatures of decomposition for coals of different ages. The greater the age of the coal, the higher the temperature of decomposition of the solid bitumen. If the temperature of decomposition coincides with the plastic state of the coal, a swollen coke is obtained. The solid bitumen is thus responsible for the swelling properties. The soft and plastic bitumen has, on the other hand, nothing to do with the swelling of the coal, but is closely related to its caking power. If extracted coal from which the oily bitumen has been removed is treated with such bitumen, no matter from what coal derived, a non-swollen and well-fused coke can be obtained from it. Hence the oily bitumen must impart the coking or agglutinating property of the coal.

OPENING OF THE NEW KENSINGTON SHOWROOMS.

H.R.H. THE DUCHESS OF YORK OPENS THE NEW SHOWROOMS.

A real British welcome was extended to Her Royal Highness the Duchess of York, both by the crowds in the flag-bedecked street outside and by the large number of guests who had assembled to witness the ceremony, last Tuesday afternoon, when she declared open the beautiful new showrooms of the Gas Light and Coke Company in Church Street, Kensington, a description of which appeared in the "JOURNAL" for Oct. 20. Her Royal Highness, who was attended by Lady Helen Graham, was received by the Governor of the Company, Mr. D. Milne Watson, D.L., and Miss Milne Watson, and the Mayor and Mayoress of Kensington. On reaching the platform which had been arranged at the far end of the ground floor of the showrooms, the Duchess of York was presented with a handsome bouquet by Miss Winnie Pople, the little daughter of one of the Kensington workmen; and afterwards she pinned on the child's dress a pretty brooch.

GUESTS AND HOSTS.

The many other guests received by the Governor and Miss Milne Watson included the Mayor and Mayoress of Westminster, the Mayor and Mayoress of Chelsea, and the Mayor and Mayoress of Paddington; Alderman Sir W. H. Davison, M.P.; Alderman Percy G. Gates, M.P.; Mrs. M. A. Cloudesley-Brereton; and the Architects, Mr. H. Austen Hall, F.R.I.B.A., and Mr. Walter Tapper, A.R.A., F.R.I.B.A.

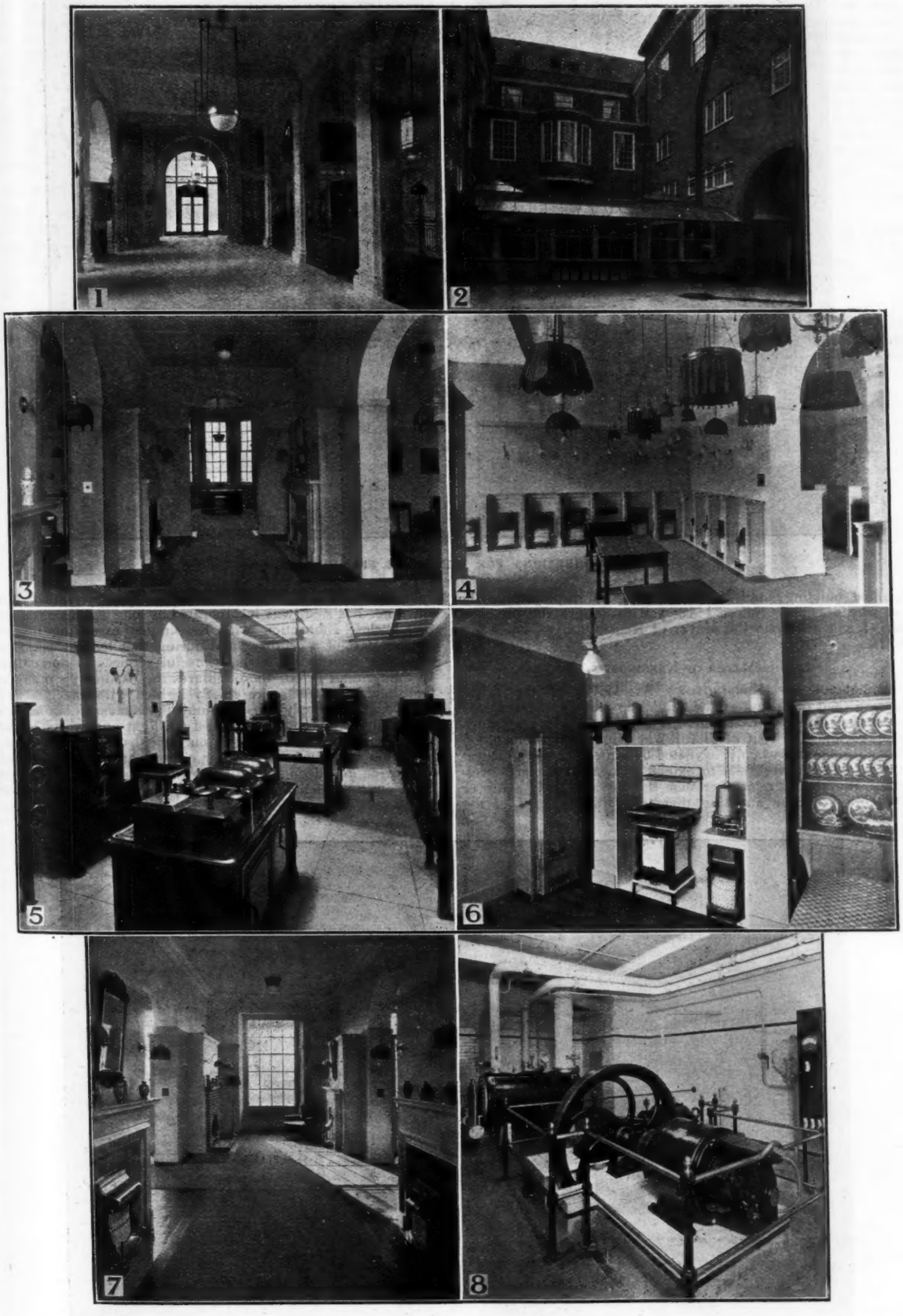
In addition to the Governor, the Company were represented by the Deputy-Governor, Mr. Henry Woodall, Mr. Thomas Goulden and General Harold Hartley, C.B.E., M.C. (Directors), and a large number of officers and men with their wives, including Mr. R. W. Foot (Assistant General Manager), Mr. W. L. Galbraith (Secretary), Mr. F. W. Goodenough (Controller of Gas Sales), Mr. Thomas Hardie (Chief Engineer), Mr. H. E. Ibbs (Chief Accountant), Mr. Stephen Lacey (Distributing Engineer and Deputy Controller of Gas Sales), Mr. S. C. Colwell (Coke Manager), Mr. Walter McDowall (Chief Officer of Stores), Mr. L. M. Simmons (Superintendent of Rental Department); the foremen, fitters, and mates employed in carrying out the gas installation work in the new buildings, under the general supervision of Mr. W. H. Becket and Mr. G. H. Field (the Local Manager); the Works Committee of the Kensington Office; and five long-service workmen in the Department, whose service with the Company totals 244 years, and whose ages aggregate 332 years.

THE GOVERNOR.

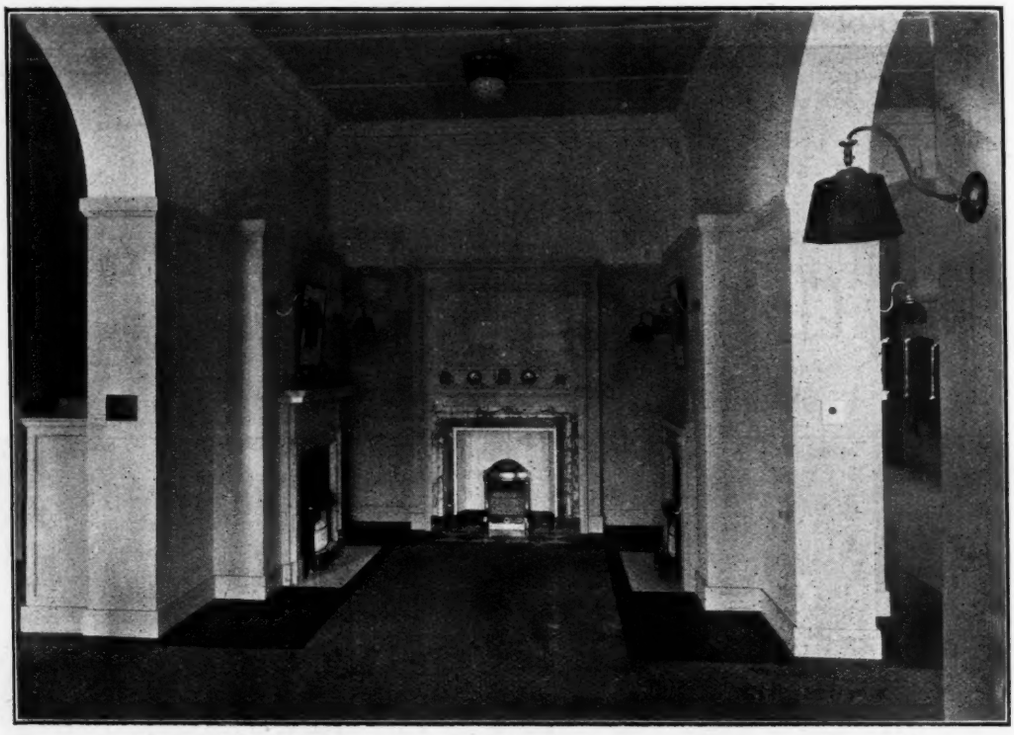
The GOVERNOR: Your Royal Highness, on behalf of the Directors of this Company and myself, I want to welcome you very heartily, and to thank you very much indeed for sparing so much of your valuable time to come here this afternoon to open our new building. We know how busy you are, and, believe me, we appreciate very highly the honour you have done the Gas Light and Coke Company by your attendance here to-day. You are following the gracious example set by the King and Queen, who in July last went to our Beckton Works and opened there the largest coal-handling plant in Europe; and we remember with great pleasure the great honour His Royal Highness the Duke of York paid us by visiting the same works in 1922. The works where the gas is made are, of course, of supreme interest; but it is also from the public point of view most important that the gas should be supplied in the best possible way and used in the best possible apparatus. It is for this reason that we have abandoned the old premises that were so well known for many years in High Street, Kensington, but which have now become inadequate, and have erected this building in Church Street.

The Gas Light and Coke Company is a very ancient Company, having been started as long ago as 1812; so that it is really 114 years old. The Company had very small beginnings, and a great many people did not believe it would succeed; but it has grown to be the largest gas undertaking in the world, operating in the largest city in the world. It is not my intention to tell you all about the Gas Light and Coke Company, because that would take a very long time; but I would just like to say that our policy as a Company in opening a showroom like this—and we are opening others in various parts of London—is to bring before the public the manifold uses of gas, because we want them to realize how much they can increase the comfort and the beauty of their homes by the proper application of gas. We want them to consume gas efficiently, but we also want them to consume it in an artistic manner; and we have set ourselves to show that in any house gas can be both ornamental and useful. Our object in doing this is to make the lives of the people more pleasant; and at the same time, by extending the use of smokeless fuel, we shall purify the air of this great city. One of the curses of our cities is smoke, but those of you who are old enough to remember London forty years ago will realize how much cleaner and healthier it is to-day than it was then; and this improvement is largely due to the efforts of the gas companies.

Last week, Your Highness, you visited a gas-works in Edinburgh, and so you know something about that end of the business; and now you are seeing the other part. This building has been put up under the supervision of two Architects—Messrs. Austen Hall and Tapper—and when you have seen it, I am sure you will agree that it is a very beautiful and a very



1. Main Entrance, Inquiry and Cashier's Counter, with Gas-Fires, and Bye-Products in Cabinets. 2. Serving Window and Fitters' Store. 3. Modern Gas-Fires. 4. Types of Modern Lighting Fittings and Modern Gas-Fires. 5. Restaurant Equipment. 6. Modern Kitchen, showing Cooker, Fire, Hot-Water Circulator, and Gas-Heated Clothes Dryer. 7. Coal Grates Converted to Gas-Fires. 8. Spencer-Bonecourt Boiler for Central Heating of Premises, and Gas-Engine and Dynamo Set for Generation of Current.

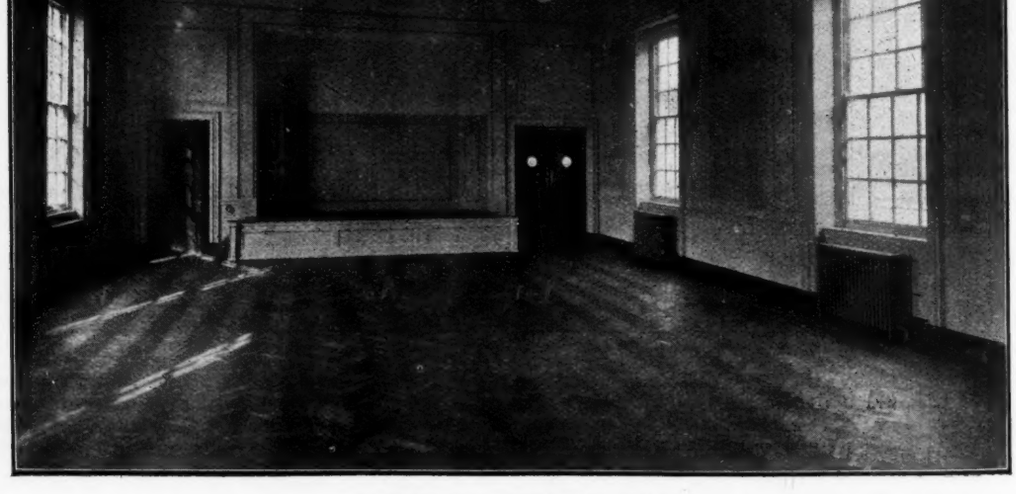


SUGGESTIONS FOR HANDSOME FIRE PLACES.

dignified building, and that everything is displayed in the best way possible. Before I ask you to declare the premises open, I will call upon the Mayor of Kensington to say a few words.

THE MAYOR OF KENSINGTON.

The MAYOR OF KENSINGTON: As Mayor of the Royal Borough, and on behalf of the Aldermen and Councillors, and also of the citizens of Kensington, I beg to say how very much we appreciate this visit of Her Royal Highness. Kensington always feels proud when it is visited by a member of the Royal Family, and it never fails to extend a loyal and hearty welcome. We always remember that the Royal Family are ever ready to encourage anything that tends to the good of the community. The Gas Light and Coke Company, which, as the Governor has said, was incorporated as long ago as 1812, have had a close connection with Kensington extending over the greater part of a century; and during that lengthy period the Company have rendered most useful services to our citizens. In many miles of our thoroughfares the Company's mains are laid; and our streets are chiefly lighted with the gas which the Company supply also to many thousands of our citizens. For many years we have enjoyed the light and warmth which the Company have brought to our hearths and homes; and I hope that the tribute which our citizens have paid has helped to provide an adequate return to the proprietors for the very large outlay which they have made and the valuable services which they have rendered.



COOKERY DEMONSTRATION HALL.

The Company have conferred another benefit upon us by erecting in this important thoroughfare of Church Street a handsome range of buildings for new offices and showrooms. These premises have greatly improved the appearance of the street, and reflect great credit both on the taste of the Company and on the skill of the architects. There is one feature of the building to which I would call special attention. So far as I can see, there are no chimneys visible on its roof. The Company are therefore setting us a good example in the way of avoiding the smoke which, as the Governor has pointed out, pollutes the atmosphere of the Metropolis. Allow me to wish continued prosperity to the Company, and to thank Her Royal Highness for so kindly coming to Kensington this afternoon.

HER ROYAL HIGHNESS DECLARES THE SHOWROOMS OPEN.

H.R.H. THE DUCHESS OF YORK: Ladies and Gentlemen,—It gives me very great pleasure to come here this afternoon to open the new showrooms of the Gas Light and Coke Company. Knowing what a great benefit gas is in the modern home—and especially the working home—I am delighted to associate myself with this new development in Kensington. I have very much pleasure in declaring these new showrooms open. [Applause.]

The Duchess then operated a switch that lighted up the inside lamps. A number of presentations were then made to Her Royal Highness, after which she made a tour of the premises—finding them doubtless in every respect worthy of Kensington and worthy of a Royal opening. During her tour the Works Committee and the long-service workmen were presented.

It is, of course, not practicable to exhibit in all the Company's showrooms a full selection of the many types and designs of apparatus available. The Directors felt, however, that in the Royal Borough of Kensington the Company should have a really comprehensive display for the benefit not only of those who live in the borough, but of all in the western districts of London to whom this is a convenient and accessible shopping centre. The showroom accommodation available at the old premises in the High Street was inadequate for this purpose. At the same time, owing to the rapid growth of the Company's business in Kensington, the accommodation for the foremen, fitters, and stores had become quite inadequate. For these reasons the Directors decided to leave the premises in High Street, and to provide, in a building specially designed for the purpose, not only showrooms worthy of the Company and of the Royal Borough, but also suitable modern accommodation for the clerical and fitting staff and for the stores. There are over 500 men employed at the Kensington office, which is directly responsible for service to 44,000 households.

The contractors for the building were Messrs. John Greenwood, Ltd.; and for the internal fitting up, the Nautilus Fire Company, Ltd., the Plaster Decoration Company, Ltd., Messrs. Wm. Bainbridge Reynolds, Ltd., and Messrs. J. Whitehead & Sons, Ltd.

The opening function proved enjoyable in all respects, for everything from start to finish passed off with that smoothness which can be associated only with perfect organization. Much admiration was bestowed upon the beautiful things displayed; and there was excellent music, with generous hospitality.

This gracious act of the Duchess of York in declaring open these palatial showrooms and lecture hall, which are bound to play a worthy part in helping to bring practical assistance and advice within the reach of thousands of homes, is but one more proof that our Royal Family believe—to quote the words of His Majesty the King—that the strength of the nation lies "in the homes of the people."

AMERICAN GAS ASSOCIATION.

Annual Convention at Atlantic City.

[FROM AN AMERICAN CORRESPONDENT.]

The Eighth Annual Convention of the American Gas Association at Atlantic City was called to order by the President, H. C. Abell, on Tuesday morning, Oct. 12. After welcoming the members, the President asked the Secretary to read a letter from the Hon. Herbert Hoover, Secretary of Commerce, sending best wishes for a successful meeting, and complimenting the Association on its co-operation with the Government. Then followed the usual, but always welcome, greetings from the Institution of Gas Engineers, the British Commercial Gas Association, the Gas Associations of France and Switzerland, and one from far-off Australia. These international courtesies, accompanied as they are by the bestowal of honorary membership on the Presidents of the various societies, are harbingers of increasing friendship between nations.

STRENGTH OF THE AMERICAN GAS INDUSTRY.

The next two reports showed the size and financial strength of the gas industry in a nation of 110 million people, when concentrated in one organization. The Treasurer acknowledged total ordinary receipts of $355,000, of which $237,000 were dues of company members. The expenses were $351,000, including $111,000 for salaries paid to an efficient headquarters staff which year by year increases in value. General assets, mostly cash and securities, were $105,000. This, however, is not the whole story, for the educational fund contains $10,000, the laboratory fund $50,000, and the industrial research fund $56,000. The possession of these resources entails great responsibility for their proper utilization; but there will be no shirking in this regard, and the future promises still more opportunity, as $100,000 a year will be available for five years to pursue research bearing upon the industrial use of gas.

The Secretary-Manager, Alexander Forward, told of 568 gas company, 416 manufacturer, and 3242 individual members. Gas sales in 1925 were 457 billion c.ft., and there was a gain of 425,000 meters.

PRESIDENTIAL ADDRESS.

Next came the President's Address, with Vice-President A. B. Macbeth in the chair. Mr. Abell referred to the recent comprehensive report of the Committee appointed to suggest a five year programme of Association work. This has resulted in definite steps, one of which is the provision for industrial research. In a broad way, the industry is concerned as to the use of the best raw materials, the best means of generating gas and its most economical distribution, and the development of the most economic appliances and their safe use. As to the appliances, the President urged the purchase of only those types that had been approved by the Association testing laboratory. He stressed the importance of a proper rate structure to increase gas sales. He spoke of the correspondence course for gas company employees now conducted by the Columbia University; of the splendid exhibit of bookkeeping methods by the Accounting Section; of the "blue star" (completely equipped for gas) house being sponsored by the Commercial Section. He said the industry can advance only as it takes advantage of its opportunity. In conclusion he cited the surprising fact that 1200 members were serving on committees, and thanked them all for their unselfish labours.

The President received a beautiful silver-mounted gavel and a framed testimonial for his two years of brilliant service. The Treasurer, Mr. H. M. Brundage, who is retiring after six years of skilful financing, was given a similar testimonial.

ELECTION OF OFFICERS.

Following the adoption of some amendments to the constitution to carry out the five year programme came the election of a President, Vice-President, and Treasurer. The following were elected:

President—A. B. Macbeth, Los Angeles, California.
Vice-President—Oscar H. Fogg, New York, N.Y.
Treasurer—C. E. Paige, Brooklyn, N.Y.

The session ended with "Advertising—Your Industry's Opportunity," by James O'Shaughnessy, of the Association of Advertising Agencies. He stressed the importance of spreading far and wide the knowledge that health and economy would follow in the wake of a city atmosphere purified by the substitution of gas for coal as a universal heating agent.

SERVICE RATE.

The second general session enabled the members to get opinions of the gas industry from four outside viewpoints. It opened with a splendid address by Philip Cabot, of the Harvard School of Business Administration, on "Selling all the Gas that should be Sold in the Home." He showed clearly that gas companies were furnishing two things, a service and a commodity, but were charging for the commodity only. Thereby, the growth of domestic sales was greatly hampered. The remedy was a service rate. The practical difficulties of this introduction were not insurmountable, and during a prosperous era was the accepted time.

GAS FOR HEAT TREATMENT.

"The Gas Industry and the American Manufacturer," as given by J. R. Allen, of the International Harvester Company, described in helpful detail the advantages and disadvantages of gas as compared with solid and liquid fuel for the heat treatment of metals used in the harvesting machine. David Lawrence, in "The Public's Measure of an Industry," described the great improvement during the last twenty years in the public attitude towards public utility corporations, and emphasized the value of keeping consumers informed of all details of the service

being rendered "Perfecting Service and Safety," by G. K. Burgess, Director of the U.S. Bureau of Standards, told of the need for a continuous, adequate, uniform, and cheap supply of gas, and that within a wide range any B.Th.U. content would give satisfactory service. The testing laboratory and the Gas Safety Code represented two important steps in advance. There was need for a general research laboratory under Association management.

The session closed with the award of the Addicks Meritorious Service Medal to H. F. Ketz, of Santa Barbara, California, for exceptional bravery in shutting-off the town supply during an earthquake. There were seventeen awards of the McCarter Medal, each representing a life saved by the recipient. The medallists received well-deserved cheers as the presentations were made.

Public Relations.

Wednesday evening, as usual, was devoted to a "Public Relations Symposium." H. G. Wells, of the Massachusetts Utility Commission, spoke on "Regulations and Management," and Frank Milhollan, of the North Dakota Commission, discussed "The Utility and the Commission." Both bore testimony to the greatly improved relations during recent years between the public and the gas companies. Their talks were preceded and followed by delightful soprano solos rendered by an operatic prima donna.

The last general session on Thursday morning was most interesting throughout. C. S. Reed, whose subject was "Building a Rate to Build the Business," showed lucidly, in original fashion, the weakness of a rate based only on a quantity charge; and he left with his hearers some valuable ideas as to the best methods of changing over to a three-part rate. He called attention to the great number of rates customary in selling electricity, and saw no reason why selling gas should be essentially different. He believed that a change in rate structure should not be difficult to accomplish after a proper presentation of the subject to the gas consumers, as the domestic consumers most benefited would be those taking from two to six thousand cubic feet per month, forming a majority of all users.

Reports of Committees.

In quick succession, the Chairmen of various General Committees called attention to the salient points of their printed reports. The Committees were those on Rate Structure, Rate Fundamentals, Accident Prevention, Customer Ownership, Co-operation with Educational Institutions, and Education of Gas Company Employees. The President said he considered each of these reports a classic in its line, and each represented much self-sacrificing labour.

The Committee on Resolutions presented a recommendation from the Commercial Section that the Association take effective steps to ensure the sale by member companies of only those appliances that have been approved by the Association laboratory. This was passed unanimously, and should in time prevent the manufacture of inferior gas-using equipment.

The Committee on Time and Place recommended October and Chicago for the 1927 meeting. This will mean a smaller gathering, as most of the membership live in the eastern section; but is only just to many of the western members, unable to travel the long way to the Atlantic Ocean.

Channing H. Cox, Ex-Governor of Massachusetts, spoke on "Finance and Public Relations." It was another outside viewpoint of the industry, well given and enthusiastically received. He said that so long as the gas industry follows the essentials of wise management and continues to improve its relations with the public, it will have no difficulty in financing all its requirements. On its conclusion, the gavel fell.

Sectional Meetings.

This account so far has covered in the briefest outline the general sessions only. From Monday to Thursday, inclusive, the usual sectional meetings were held each afternoon from two to five, in number as follows: Accounting, three; Commercial, three; Industrial Gas, three; Manufacturers, one; Publicity and Advertising, one; Technical, three. The average attendance at each meeting was over two hundred, and there was keen interest from beginning to end, as evinced by the many and searching questions asked in discussion. Sectional organization is a practical device to group the workers of an industry by similar interests. In no other way would it be possible to have this year, as stated by the President, 1200 members actively engaged in Association work. Not only is there more work done, but, in addition, the yearly consideration of such work is more thorough and of more value, because of the comparatively small group before which it is presented, and of the special interest felt by each one of the group in every subject. Prior to the organization of the Association, the American Gas Institute had often met only as one body of four or five hundred. This resulted in unsatisfactory consideration of papers and reports, because discussion was deterred by the size of the gathering and the fact that no one subject was of special interest to more than a small portion of the audience.

The Association, as the sole representation of the national industry, increases yearly in strength and power for good. While a unit for all exterior contacts, its internal organization may be specialized as much as experience indicates. No wonder that each annual meeting is considered of more value than any previous one, and that companies and individuals are more and more willing to spend the money represented by the large attendance, which this year was 4012. A feature of this attendance is scores of street and inside foremen, sent for a day apiece by the larger gas companies within a few hours' ride of Atlantic City. Their principal benefit is from the exhibition of apparatus and appliances. This year there were 222 exhibits with 56,000 sq.ft. of space, all conveniently placed on the same ocean pier, 1900 ft. long, in which are the various meeting rooms. This arrangement ensures passing back and forth through this exhibit while going to and from the meetings.

As usual of late years, the men had no time for play during daylight hours. The ladies had luncheon, tea, and cards. In the evenings there was dancing for all, and on Monday night, in addition, the President's reception.

GAS FOR WELDING BOILER FLUES.

An extensive gas system for the carrying-out of varied industrial operations has been installed in the North Fond du Lac shops of the Minneapolis, St. Paul, and Sault Ste. Marie Railway; and some of the work done by this means has been described by Fred. W. Hainer, of the Wisconsin Power and Light Company, to the Wisconsin Utilities Association.

One of the adaptations of gas is in connection with the welding of tips on 2-in. locomotive boiler flues. Flues which are cut out of the boiler shells require the welding-on of a short piece of pipe before they can be installed. The furnace in which this welding operation is performed is built with a heating chamber about 3 in. deep, 9 in. wide, and 9 in. high. A small opening is formed through the entire setting, so that it strikes the exact centre of the 9 in. by 9 in. sides. A tube with a loosely fitted tip, to be welded, is inserted in this opening, so that the joint lies within the heating chamber, where heat is applied by four tunnel type burners located at the corners of the heating chamber, and playing directly on the tube.

This furnace not only increased the speed of operation, but produced the work at a lower cost than the former oil furnace, which had been giving what were generally considered very good results. The time of actual furnace operation has been reduced more than 25 p.ct. Excessive scaling, burning of tubes, and poor welds have been reduced to a minimum. It had been necessary to shut down the oil furnace at least three times a day, in order to clean out the burner and chisel off the heavy slag which had accumulated in the hearth. It had also been necessary to rebuild the old furnace every three or four weeks, each rebuilding taking from two to three days, which came out of the operating schedule. The gas furnace has practically eliminated the cleaning and slagging operations, and reduced rebuilding to three times a year; the latter work being carried on while the furnace is idle. A considerable saving has resulted in discontinuing the use of compressed air at 60 to 70 lbs. pressure, for combustion with oil, and for blowing-back the oil flame from the operator's station in front of the furnace.

All these advantages have been brought about through the improved temperature control with gas, the ability to regulate the furnace atmosphere, a freedom from delays due to a heavy or dirty fuel, and an absence of slag formation in the heating chamber.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

Development and Reconstruction of the Portslade (Brighton) Gas-Works.

Sir,—While thanking Mr. Rutter for his kind letter in reply to my query, I fear there has been some misconception as regards the illustration.

My query was confined to "allowance for expansion in the all-silica settings." The illustration clearly shows silica shields and moulded retorts, whereas Mr. Rutter definitely said:

> "The all-silica settings are of similar design to the moulded fireclay retort settings; the only differences being the use of segmental silica retorts, and the shield tiles being omitted."

I therefore fear that what is depicted is the all-silica correct expansion allowance on the wrong (fireclay shielded retort) illustration; and if so, this will, unless corrected, confuse the youthful idea.

The calculation being for 9 ft. of silica, shows that the whole of the stay wall coming horizontally between the pier walls is of all-silica. May I ask if, in the fireclay setting, the allowance is 3 ft. (the silica portion of wall between the fireclay retorts) by $\frac{2}{16}$ in. = $\frac{3}{16}$ in. of allowance, and how is this $\frac{3}{16}$ in. distributed?

Further, the "S.X." boards are shown against the pier wall, only opposite the square bricks, and not at all against the moulded 95 p.ct. silica shapes. Why is this, as the expansion will be more, if anything (there being no brick joints), in line with these special shapes? As regards the "S.X." boards, I feel sure many readers will not be certain of what is meant by this trade term. Could the author please describe them?

While craving your indulgence, I apologize for this second communication.

Ad rem.

Oct. 21, 1926.

LEGAL INTELLIGENCE.

RATING OF A COMBINED GAS AND ELECTRICITY UNDERTAKING.

Aldershot Gas, Water, and District Lighting Company's Appeal.

In the Court of Quarter Sessions for the County of Southampton, held in the Guildhall, Winchester, on Wednesday, Oct. 20, there was opened an appeal by the Aldershot Gas, Water, and District Lighting Company against an assessment of their property for rating by the Assessment Committee of the Hartley Wintney Union. On the Bench were Sir FRANCIS GORE (Chairman), Mr. KEEPING, and Mr. ROBB.

The Company were represented by Mr. A. S. COMYNS CARR, K.C., and Mr. GERARD SANDERS (instructed by Messrs. Eve & Clinton); and the respondent Union by Mr. RAYNER GODDARD, K.C., and Mr. BLAKE ODGERS (instructed by Messrs. Lamb, Brooks, & Bullock). Mr. E. HOWARD COLLINS, rating surveyor, was acting for the Aldershot Company; and Messrs. WILLIAM EVE & SON for the Hartley Wintney Union.

Mr. COMYNS CARR, at the commencement of the proceedings, said the appeal was against the assessment of the Company's property in a number of parishes in the Union of Hartley Wintney; but before going into the figures there was a point which he wished to bring to the attention of the Bench. It was a very simple point, which, if it did not entirely dispose of the matter, might result ultimately in considerably shortening their labours. The Assessment Committee had chosen to follow, and in spite of protests by the Company had persisted in, the course, in each of the parishes concerned, of putting under one assessment the gas undertaking and electricity undertaking of the Company; and they declined to supply the Company with any particulars as to how much they had put down in these parishes for gas, and how much for electricity. According to the decision in the case against the York Assessment Committee in connection with the rating of the York Railway Station, it was a question of fact for the Sessions in every case whether what was treated by an Assessment Committee as one hereditament was one or two hereditaments; and if it was in fact two hereditaments, then the assessment could not stand. In this case, not only as a matter of fact, but also as a matter of law, the gas and electricity undertakings of the Aldershot Company were necessarily two hereditaments. There were separate mains, separate generating station for electricity, and separate producing works for gas. It might well be that the showrooms would serve both purposes; and they were separately assessed. The things against the assessment of which the Company appealed were the productive works, mains, and cables. Not only were these entirely separate, but by the Acts of Parliament which governed the Company—and he believed the practice was common to Acts which related to undertakings providing both gas and electricity—they were required to keep the two businesses entirely separate, and to publish separate accounts for each, in respect to both capital and revenue. If necessary, valuers would tell the Court that it was impossible to value together gas and electricity. The principles on which each was valued, though the same on general lines, were quite different when one came to details. For some reason, however, best known to themselves, the Assessment Committee had persisted in valuing them together, and had declined to give the Company the particulars which, if there ever had been a valuation, must be in their possession. If the Company could get this information, they would be able to see how far it corresponded with the separate valuations which had been prepared by the Company's valuers.

The CHAIRMAN: Do you deal in water?

Mr. COMYNS CARR: Not in this Union. Here it is only gas and electricity.

The CHAIRMAN: From end to end, the gas mains and gas-works are altogether separate from the electricity works and cables?

Mr. GODDARD: No; that is entirely in dispute.

Mr. COMYNS CARR: The only thing common is the showrooms, where the Company receive customers and sell fittings; but these are separately assessed, and are not in this appeal at all.

Mr. GODDARD said that there were about a dozen appeals; but in only one of the parishes—namely, Farnborough—did this question really arise at all. In Fleet, Hawley, and Cove the electricity undertaking was a very recent development; and, in point of fact, the appellants had not been rated, and were not now rated, in respect of electricity in these three parishes. The valuation for Cove, for instance, was on "land occupying gas mains, pipes, and appurtenances." In the case of Farnborough, however, the description was "gas and electricity works and land occupied by mains, pipes, and appurtenances." In 1924 there was an agreement between the Company and the Assessment Committee with regard to the rates in the first three named parishes; and at that time there were no electric cables in them. In fact, the Assessment Committee did not know until these objections were lodged that there had been an extension of the electricity undertaking into these parishes, and the valuations were exactly the same as in 1924, when the figures were agreed. With regard to Farnborough, the position was that when this agreement was come to in regard to the assessment in that parish, the Company did not take any objection; and they were rated, as they always had been rated there, in one assessment. It was not until the fertile brains of some valuer who had advised the Company came into play that this point was raised. Hitherto the Company had been content. The Assessment Committee went further than this, and maintained that the undertaking was rightly valued as one in Farnborough. It was true that the gas was made at Aldershot, but in Farnborough there was a large holder for the supply of the surrounding district, and repair shops for meters and stoves, together with electricity generating plant. The electricity plant was, in fact, driven by gas from the gas-works. So that they had the two things together in one premises. The point raised by the Company was therefore one which he contended the Bench should reject.

Mr. COMYNS CARR said that the other side admitted that in Farnborough the two undertakings were rated together; and of the total rateable value of all the parishes in the Hartley Wintney Union (£5486), nearly two-thirds related to Farnborough. Thus Farnborough was the substance of the appeal. It was true that the gasholder there and the electricity works were on the same land, and that the dynamo was driven by gas, but this could be done equally well if the gas was supplied by another company. It did not in the least alter the fact that they were separate undertakings. If the Assessment Committee had gone into the matter carefully, he did not see why they should object to give the information for which the Company had asked. The agreement to which reference had been made did not, he submitted, affect this matter at all.

The CHAIRMAN: It is a very difficult point; but the conclusion we have come to is that, taking all the circumstances together, it is one concern, and ought to be rated as one concern. Mr. Goddard has hinted that there will be a different assessment next year, and it seems rather a pity that you cannot jog along together until then.

Mr. COMYNS CARR replied that the Committee had deposited supplementary valuation lists already; but so far as the Company could see, there had been no alteration in method. If they had a fight on these supplementary lists, it would come to the same thing. He had another point which he desired to raise. The gross values shown in these assessments were values with which the Company would not be disposed to quarrel. If these were correct, and the Company secured what they regarded as the proper statutable deductions from them, they would have achieved all that they wanted to in these appeals. Here were a number of decided cases as to whether Assessment Committees were bound by the gross values which they had put in their valuations; but in this case the circumstances were different. In most of the reported cases a figure had been arrived at as the rateable value, and then for the purpose of complying with the Act the Committee had decided upon a gross figure by rule-of-thumb, and put that down. Thus an endeavour to hold the Committee to their gross value raised a highly technical question. Dealing with a gas-works, however, this was not the case. In making a valuation of a gas-works, one really did arrive at the gross value first, and then made statutable deductions from it. Therefore in accepting the gross value, and then proceeding with their statutable deductions, the Company were not taking advantage of a mere technicality, but were accepting the calculation the Committee themselves had made for the purpose of arriving at the rateable value.

The CHAIRMAN: Are you going to stand to your gross valuation?

Mr. GODDARD: Outside the Metropolis, gross value is of no importance at all. In this case, what the Court have to consider is the net rateable value.

Mr. COMYNS CARR: You cannot make your valuation without first getting the gross value, and then from this arriving at the rateable value.

The CHAIRMAN: You had better proceed on the gross valuation as appearing in the accounts, and then make your deductions.

Mr. COMYNS CARR pointed out that the Assessment Committee had had an opportunity of revising their gross figures, but had not done so, and now were bound by them. He thought he was right in saying that when the Company were before the Assessment Committee they did not contend that the gross figures were too high.

Mr. GODDARD: We were not told before the Assessment Committee that the gross was accepted.

Mr. COMYNS CARR: It may be the case that we did not specifically state that we were prepared to accept the gross valuation; but we did not contend that it was too high.

Mr. GODDARD: My friend shows great reluctance to get down to the merits of the case.

The CHAIRMAN: He says we have only to go into the question of what are the proper deductions.

Mr. COMYNS CARR: There has been some discussion between the valuers: and perhaps the Court can give us a few minutes.

The CHAIRMAN: I do think that this discussion opens up a field for an enormous amount of litigation, and that it will be very wise of the parties to do what they can to come to an agreement.

After a short adjournment,

Mr. COMYNS CARR announced that terms had been arranged. The only order they required from the Court was that the rate books should be altered in accordance with the values contained in a schedule signed by the respective parties, to be delivered to the Clerk of the Peace. No order as to costs was asked for.

It was understood that the Company have an appeal in connection with another Union, which will probably come before the Surrey County Sessions in due course.

Powers of Charge at Warrington.—It was decided at a recent meeting of the Warrington Town Council to increase the price of gas 6d. per 1000 c.ft.; but it was afterwards discovered that, before the Gas Committee could put the resolution into execution, it would be necessary to obtain an Order increasing the maximum price. Subsequently the General Purposes Committee determined that the resolution of the Gas Committee increasing the price as from Oct. 1 should be rescinded, and that the question of applying for a Special Order to increase the maximum price of gas be deferred for further consideration.

MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

SECTION I. ORDER.

Croston Urban District Council.

The maximum price now authorized in respect of the supply of gas by the undertakers is 5s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 2s. per therm.

METROPOLITAN GAS COMPANIES' OFFICIAL TESTINGS.

The Gas Referees' reports of the official testings for the past quarter give the following average calorific values for the gas supplied by the Metropolitan Companies named:

Commercial Gas Company.—477·6 B.Th.U. (declared calorific value, 475 B.Th.U.).

Gas Light and Coke Company.—501·3 B.Th.U. (declared calorific value, 500 B.Th.U.).

South Metropolitan Gas Company.—562·2 B.Th.U. (declared calorific value, 560 B.Th.U.).

South Suburban Gas Company.—503·1 B.Th.U. (declared calorific value, 500 B.Th.U.).

Tottenham District Light, Heat, and Power Company.—502·3 B.Th.U. (declared calorific value, 500 B.Th.U.).

Wandsworth, Wimbledon, and Epsom District Gas Company.—451·4 B.Th.U. (declared calorific value, 470 B.Th.U.). Three reports made in the quarter by the gas examiner appointed for the borough of Wimbledon, and the urban districts of Mitcham and of Merton and Morden [see "JOURNAL," Oct. 6, p. 46] have been annulled by the Chief Gas Examiner.

INCREASES IN THE PRICE OF GAS.

Results of the Coal Stoppage.

The Bangor Urban Council have increased the price by 10d. per 1000 c.ft., making it 4s. 4d., less the usual discounts, in respect of ordinary meters, and 4s. 2d. in the case of prepayment meters.

The Brechin Gas Company intimate an increase of 10d.

The Brigg Council have increased the price from 5s. 9d. to 6s.

An increase of 7½d. per 1000 c.ft. is intimated by the Buckie Gas-light Company, raising the prices to 7s. 1d. for lighting, and 6s. 8d. for heating and cooking.

At a special meeting, the Drogheda Corporation decided to apply to the Ministry for Industry and Commerce for an Amending Order to the Drogheda Gas (Charges) Order, 1924, increasing the maximum price of gas made under the Order from 7s. 6d. per 1000 c.ft. ordinary meters and 7s. 11d. prepayment meters, to 10s. 10d. and 11s. 3d. respectively. At a previous meeting it had been explained that, owing to the high cost of foreign coal, an increase of 1s. 8d. per 1000 c.ft. was imperative. The present price in the town is 6s. 3d. per 1000 c.ft. through ordinary meters; and the Corporation's proposal is to increase that to 7s. 11d.

The Gas Committee of the Edinburgh Town Council have decided on an increase of 7d. per 1000 c.ft.

The Glasgow Corporation Gas Committee, after a long discussion, finally recommended that the price be raised to 4s. 7d. per 1000 c.ft.

Announcement is made by the Hastings and St. Leonards Gas Company that, as from the September meter readings, the price will be increased by 1½d. per therm, making it 1s. 1d. per therm. The price to prepayment users will be proportionately raised.

In Kilbirnie there is an increase of 1s. 3d. per 1000 c.ft., making the price 8s. 4d.

The Mauchline Gas Company have increased the price from 7s. 6d. to 8s. 4d. per 1000 c.ft.

The price at Newport (Dundee) has been raised to 5s. 6d.

The Renfrew Town Council announce that the price will be raised 3d. per 1000 c.ft.

In Stirling the price has been increased from 4s. 7d. to 5s. 2d.

The price at Sunderland will be increased by 1s. 6d. per 1000 c.ft. This will make the charge for lighting, heating, and cooking 4s., and for power purposes 3s. 10d. per 1000 c.ft., less the usual discount. In the case of slot meter users, the rebate previously in force will be discontinued. In Hylton, Castletown, and Whitburn the price will be 5s. per 1000 c.ft.

A Bright Aspect of the Coal Strike.—Gas appliance sales at Blackburn during the coal dispute period show an increase of over 50 p.ct. on last year, the figures being: Cookers, 1428 in 1926, against 997 in 1925; fires and radiators, 277, against 93; boilers, 288, against 241; grillers, &c., 176, against 98; total, 2169, against 1429.

The Underground Streets of the City of London.—On Saturday last, a large party of the Districts Foremen's Association of the South Metropolitan Gas Company paid a visit of inspection to the underground streets of the City of London. They were conducted through by Mr. W. J. Liberty, Public Lighting Superintendent of the City of London, who pointed out the contents and the utility of these underground streets from main-laying and house-service points of view. The party were accompanied by Mr. W. Reading, the Hon. Secretary of the Association, who, at the close of the inspection, proposed a hearty vote of thanks to Mr. Liberty.

AMERICAN GAS COALS.

Testimony to Value from Belfast.

That he got better results from American coal than from British or Continental was the interesting statement of Mr. J. D. Smith, M.Inst.C.E., Engineer and Manager of the Belfast Gas Department, at a Home Office inquiry in Belfast into an application for a loan of £150,000 for gas-works purposes.

"As to the American coal which we are receiving," said Mr. Smith, "it is a better class of coal than that we get at ordinary times. We have 10,000 tons coming this month, and 15,000 tons each in November and December. We are practically working on American coal, and our return for residuals is about the same, though the yield of ammonia may be slightly less. From some of the Continental coal we have received, we got practically no tar or ammonia."

The INSPECTOR: Will you get up to 12,000 c.ft. of gas per ton of American coal?

Mr. SMITH: I can give you it in therms. The coal before the strike was producing 68 therms per ton. From American coal, every cargo of which is carefully analyzed, we produce from 80 to 82 therms per ton. We sell the gas on the same terms, but unfortunately we have to pay more than double for the coal.

The INSPECTOR: The residuals are practically the same?

Mr. SMITH: Yes.

Earlier in his evidence, Mr. Smith said that the necessity for the services for which the loan was required had not sprung up suddenly. A great portion of the work was held up during the war years, and they had also to meet increased demands for gas, which were now being experienced. There was a steady increase, representing between 3 and 4 p.ct. The loan now asked for was not to enable them to carry out extensions beyond the city area, but inside that area. They never went more than three to five years ahead in estimating their requirements.

"We find," added the witness, "that there is an increasing consumption of gas, and the pressure during certain parts of the day has decreased below the statutory limit, which is 2 in. We must keep to our statutory requirements. Hence the necessity to spend this money on increasing the mains." £10,000 was required for services, £25,000 for stoves—those let out on hire—£15,000 for meters, and other varying amounts for retorts, &c. Last winter the output was 16,399,000 c.ft., and they could only produce 17 millions. This meant only a slight margin of safety. The latter ought to be at least 10 p.ct. They were asking for £20,000 for machinery and plant.

PUBLIC LIGHTING IN WESTMINSTER.

Suggested Return to Normal.

At a recent meeting of the Westminster City Council, the Works Committee reported the receipt of a circular letter from the Gas Light and Coke Company, dated Aug. 18, stating that, owing to the prolongation of the coal stoppage, the Directors had been reluctantly compelled to increase the price of gas from 9·4d. per therm (3s. 11d. per 1000 c.ft.) to 9·6d. per therm (4s. per 1000 c.ft.), as from the date of recording the meter indices for the September quarter. The Company pointed out that the Directors regretted the necessity for this step; but the consumers might rest assured that the price was not being raised more than was absolutely necessary, and that it would be reduced at the earliest possible moment.

The public lighting contracts between the Company and the Council, the Committee remarked, remained in force from year to year, unless and until determined by twelve calendar months' notice in writing given by either party to the other party, which notice might expire on any day of any year. The contract of Dec. 11, 1915, which was supplemental to the original contract of May 23, 1910, provided *inter alia* that the Company's charges as therein set forth should be subject to an addition or deduction of 3½ p.ct. for every penny by which the standard price for gas supplied for private lighting might exceed or be less than 2s. 6d. per 1000 c.ft. The City Engineer reported that the estimated increased cost to the City Council for the current financial year, consequent upon the above-mentioned increase in the price of gas, was £1800. The provision in the current financial year for public lighting by gas was £23,500.

The Committee's recommendation, which was agreed to, was that, subject to the submission of an estimate by the Finance Committee, the above-mentioned unforeseen increased expenditure in respect of public lighting under the contract with the Gas Light and Coke Company be authorized.

RESTRICTIONS.

The Committee had considered the suggestions by the Chairman of the Refuges and Lighting Sub-Committee that representations should be made in the proper quarter that, in view of the termination of Summer Time, and the approach of the season when fog might be expected, public lighting should be increased to the normal. Clause 31 of the Coal (Emergency) Directions, 1926, provided that it should be the duty of local authorities to see that the consumption in their respective districts of gas and electricity for any public lighting should be reduced to the minimum necessary, provided that such public lamps as the Chief Officer of Police directed to be kept in use for the public safety were maintained as he might direct. The public lighting throughout the city had been reduced about 50 p.ct., except in certain specified positions where it was considered inadvisable to reduce it as much.

The City Engineer reported that he was strongly of opinion that normal public lighting should be resumed. Fogs might occur at

any time, and during fog it was frequently necessary to supplement the street lighting by special lighting. In the interests of public safety, and for the general convenience of traffic, the Committee considered it was essential, now that the darker evenings were approaching, that normal public lighting should be resumed. The City Engineer had made inquiries of the three companies who supplied public lighting in the city, and had been informed that there would be no difficulty on their part in resuming normal lighting, and that the saving of fuel effected by the reduced public lighting was negligible.

The Committee recommended that representations be made to the Secretary for Mines that in the public interest the restrictions on public lighting should now be removed, and the lighting increased to normal. This was agreed.

GAS AND ELECTRICITY IN L.C.C. DWELLINGS.

What About the Consumer?

The following discussion on whether gas or electricity should be installed by the London County Council in their new tenements in the Birchfield Street area, Poplar, shows how little the consumer is brought into the question when those who are advocates of electricity are holding forth on its assumed advantages. The fact that the consumer has to pay the piper does not seem to give him the benefit of calling the tune. The discussion took place on Oct. 19 at a meeting of the London County Council.

Miss A. SUSAN LAWRENCE, M.P. (South Poplar), said that in their report, the adoption of which was moved, the Housing Committee had not made provision for electric lighting, though they had provided for gas cookers. The Poplar Borough Council, she affirmed, had a very successful and excellent electricity supply, which they were endeavouring by every possible means to popularize in the Borough. Why were the rooms not to be lit by electricity? For what reason did the Committee suggest gas cookers instead of electric cookers? In regard to cooking apparatus, the Borough Electricity Works had been very successful. She thought this would be a good opportunity for encouraging municipal enterprise, in the first place by putting in electric instead of gas cookers, and in the second place by installing electric light. The rooms should be lit by electricity, instead of by gas, which, after all, was a "much inferior illuminant."

Mr. G. W. MILLS (South Poplar): I beg to second.

A GUARDED REPLY.

Lieut.-Colonel CECIL B. LEVITA, C.B.E., M.V.O. (North Kensington, Chairman of the Housing Committee): I am obliged to Miss Lawrence for drawing attention to the question of electric lighting in these tenements. I cannot undertake to give a definite reply at the moment, having no knowledge of the facts in regard to these tenements. Incidentally, I would remind her that the Council is building at the present time twice as many tenements as have been built during its whole lifetime. The Committee has accepted the principle that electric light should be installed wherever possible; and, in fact, we are installing electric light in such buildings, even though it involves a bigger cost. I think that we are all in favour, in the Committee, of electricity for lighting purposes. When it comes to the question of using electricity for cooking, I am very doubtful whether, up to the present, the public with which we have to deal is satisfied with electricity for cooking. I have been reading something about certain objections which were raised somewhere in the East End of London with regard to the question of electricity *versus* gas for cooking. I understand there were grave objections raised by people who do use electricity for cooking. We ourselves, a couple of years ago, fitted one tenement with electricity for cooking purposes. I think most members of the Committee have been down there, and have interviewed the tenants. Distinctly the opinion of the tenants there is against the use of electricity for cooking. There are certain features which possibly should be taken into account, but for the present, although we may not be entirely satisfied with gas for cooking, it is certainly more economical than electricity, and is more satisfactory to the housewife. As regards lighting, certainly the Committee is in favour of using electric light wherever possible.

Miss LAWRENCE: Will the Chairman look into the matter with regard to both lighting and cooking?

Colonel LEVITA: I shall have to consult the Committee as to whether they desire electric cooking to be introduced in every tenement. I do not want it to be thought that we are committed to that.

The amendment was, by leave, withdrawn, and the report adopted.

TRADE NOTES.

Orders for Tully Plants.

Messrs. Tully, Sons, & Co., of Newark-on-Trent, have received orders to instal a coal gasification plant in Dalkeith (capacity 150,000 c.ft. per day), and another in Ireland (capacity 70,000 c.ft. per day).

Renold Standard Drives.

Messrs. Hans Renold, Ltd., of Didsbury, have issued a revised edition of their standard drive booklet. The outstanding features are the increased range available up to 10 H.P., and the reductions in price the firm have been able to make due to the increased demand.

Gas Light and Coke Company's Church Street Showrooms.

All the plaster work, ceilings, tiling, woodwork painting, marble chimneypieces, marble floor, ornamental metal work, the building of partitions and arches, and all joinery such as fitments for fires, chimneypieces, showcases, and filing cabinets were carried out by the Nautilus Fire Company, Ltd.

NORTH-EAST COAST COAL TRADE.

From our Own Correspondent.

Business on 'Change has again been mainly confined to chartering of boats for import coal, and there is a decided boom in freights for transatlantic cargoes. Prompt boats are extremely scarce, and high rates are being paid for November and December.

Efforts are being made on all sides to get pits reopened, but, though these are meeting with success in some cases, there is no coal surplus to local requirements. Nominal indications of prices for forward business are still too high to be taken seriously by buyers.

YORKSHIRE AND LANCASHIRE COAL TRADE.

From our Local Correspondent.

The colder weather and the increased activity of the Miners' Federation officials have caused a little anxiety during the past week, although the situation is well in hand.

Supplies of domestic fuel continue to move freely from the Midlands, and recent outputs have been sustained, with additions from the West and South Yorkshire groups. There are indications that considerably more men will be at work in all parts this week.

With the end of "summer time" there has been an increase in the demand for gas, so that gas companies find in many instances that their stocks have depleted more rapidly than they anticipated. These cases have been satisfactorily dealt with, and with considerable supplies of American fuel en route there should be no cause for anxiety.

COAL TRADE IN THE MIDLANDS.

From Our Local Correspondent.

Supplies have fluctuated, and in some directions the shortage has been accentuated. In these circumstances pit-head prices have not found any steady basis. There has been keen competition for the limited amount of free coal available. London dealers have been willing to pay substantially more than district buyers are disposed to concede; as much as 60s. at the pit-head has been bid.

With the pronounced drop in the temperature, a domestic ration which was more than sufficient a few weeks ago falls far short of demand now. The irregular operation of the control involves inequalities, and complaints are louder on the part of consumers, distributors, and local authorities. Retailers' charges vary from 3s. 3d. to 3s. 9d. per cwt., and this range has to be extended according to transport costs. The colder weather has not only stimulated the demand from householders, but the requirements for heating hospitals and other institutions have increased.

Hence, notwithstanding a net increase in the output, industrialists have been more severely pinched. Outcrop coal is still playing an appreciable part in keeping plants going. Though slacks are less scarce, the market stringency is not perceptibly relieved. From 32s. 6d. to 40s. is paid for them at the pit-head, and favourably placed collieries can, if they will, get a premium on the prices which nominally rule for all classes of industrial fuel.

CURRENT SALES OF GAS PRODUCTS.

The London Market for Tar, Tar Products, and Sulphate.

LONDON, *Oct.* 25.

The demand for pitch continues, and the price has advanced further. It is reported that as much as 190s. per ton has been paid on the east coast. Supplies are exceedingly scarce.

Creosote also is scarce, and the price is firm at about 9d. per gallon in bulk at makers' works.

Tar spirits continue in demand. Solvent naphtha, 95/160, is about 2s. 2d. per ton, pure benzole about 3s. per gallon, and pure toluole about 3s. to 3s. 3d. per gallon.

Tar Products in the Provinces.

Oct. 25.

The average values of gas-works products during the week were: Gas-works tar, 111s. to 116s. Pitch, East Coast, 180s. to 182s. 6d. f.o.b. West Coast—Manchester, 172s. 6d. to 175s.; Liverpool, 175s. to 178s.; Clyde, 178s. 6d. to 180s. 6d. Benzole, 90 p.ct., North, 1s. 11d. to 2s.; crude, 65 p.ct. at 120° C., 1s. 4d. to 1s. 5d., naked at makers' works; 50-90 p.ct., naked, North, 1s. 11d. to 2s. Toluole, naked, North, 1s. 11d. to 2s. nominal. Coal-tar crude naphtha, in bulk, 9d. to 9¼d. Solvent naphtha, naked, North, 1s. 9d. to 1s. 10d. Heavy naphtha, North, 1s. 1d. to 1s. 2d. Creosote, in bulk, North, liquid, 8¼d. to 8⅜d.; salty, 7⅞d. to 8d.; Scotland, 7⅝d. to 7¾d. Heavy oils, in bulk, North, 7⅛d. to 7⅜d. Carbolic acid, 60 p.ct., 1s. 4d. to 1s. 5d. prompt. Naphthalene, £11 to £14; salts, 90s. to 100s., bags included. Anthracene, "A" quality, 2½d. per minimum 40 p.ct., purely nominal; "B" quality, unsaleable.

Gas Manager and Coal Thefts.—During a prosecution last week against a Derry carter for coal pilfering, Mr. George Walmsley, Manager of the Gas Company, said they had been greatly troubled with pilferage from carts, and recently it had become so serious that a number of carters approached him, and said they would refuse to cart any more coal unless they got protection. Every consignment was from 10 to 20 tons short, though that shortage was not wholly due to pilfering. Their loss annually would be up to 200 or 300 tons. The prosecuting police officer said that the defendant, who was carting the coal from the quay to the Gas Company, was being followed by a detective-constable. Defendant was sitting on the top of a load of coal; and when passing the street where he resided, he lifted a large lump of coal weighing about half-a-stone, and dropped it on to the road, whence it was removed by children into a house. Accused was sent to gaol for a week.

Guaranteeing a Gas Consumer.

In the Ipswich County Court, before Judge Chetwynd Leech, a case has been heard in which the Ipswich Gas Company sought to recover from Herbert T. Arnold the sum of £13 15s., the amount of a gas account incurred by a Mr. James, for whom it was contended Mr. Arnold was guarantor. After legal arguments, his Honour decided that the agreement did not require any stamp. Mr. Charles Spriggs (Clerk to the Gas Company) produced the agreement, and explained that the words "payment guaranteed by Mr. H. T. Arnold" were written on the form by witness after the document had been signed, merely as a memorandum. Mr. James informed him that Mr. Arnold had guaranteed payment, and he then crossed out the word "witness" on the form and substituted "guarantor." For the defence, it was urged that the documents were not explained to Mr. Arnold, who could in no way be liable to pay more than 30s., which was the amount stated in the contract as a deposit. Mr. Arnold said he took it that signing such a form was tantamount to giving a tradesman's reference, and no more. His Honour said he was satisfied plaintiffs must succeed. Mr. James was told that he must pay a deposit or get a guarantor. He chose the latter alternative, and secured the name of Mr. Arnold, who was a butcher supplying him with meat. He was satisfied the document had the word "guarantor" on it when Mr. Arnold signed it, and that the latter was aware that he was undertaking some obligation. It might be that he thought it was for only 30s., but he clearly signed as guarantor for Mr. James's obligations to the Gas Company, and it followed, therefore, that he was liable to the Company for any default. The fact that he had not fully appreciated the extent to which he had committed himself could not alter the circumstances. He sympathized with him, but there must be judgment for plaintiffs with costs. Leave to appeal was granted.

Woodall-Duckham Companies.—From the 1st prox., the Woodall-Duckham Companies' London offices will be at Allington House, Victoria Street, London, S.W. 1. The telegraphic address will be: "Retortical, Sowest, London;" and the telephone No.: Victoria 8631 (six lines).

Cost of the Strike to Clitheroe.—In the Clitheroe Town Council. Mr. J. Boothman (the Chairman of the Finance Committee) said that, as a result of the high cost of imported coal, the gas-works account was overdrawn to the extent of £7000. It would take three years, with the price of gas advanced 6d. per 1000 c.ft., to make good the deficiency.

Extension of Gas Service at Richmond.—The Richmond (Yorkshire) Town Council have approved a recommendation from the Gas Committee that sanction be sought to extend the gas service to the neighbouring townships of St. Martin's, Hipswell, Hudswell, Sleegill, Skeeby, and Easby, and to part of the Catterick Camp, the new military centre in course of completion, which is to be a "Northern Aldershot." The Mayor (Councillor J. C. Eyles) made a strong appeal to the Council to take in the whole of the Catterick Camp, but the Council did not accept the suggestion.

A Good Year at Tamworth.—Dr. A. E. Richardson (Chairman) presided at a general meeting of the shareholders of the Tamworth Gaslight and Coke Company last week. The Directors reported that the profits for the year ended June 30 amounted to £1228. Dividends for the half-year ended Dec. 31, 1925, at the rate of 7½ p.ct. per annum on the old shares, and 5¾ p.ct. on the new shares, less income-tax, were paid in March; and the Directors recommended that similar dividends be paid for the half-year ended June 30 last. The receipts from the sale of gas showed an increase of £734 over the previous year.

Gas Meter Testing at Edinburgh.—In his report upon the working of the City of Edinburgh Gas Meter Testing Department for the year May 16, 1925, to May 15 this year, Mr. William Gordon, the official Inspector, states that the number of meters tested and examined was 85,353—868 wet meters and 84,485 dry meters. Fees to the amount of £4717 were collected. Increases of 8620 meters and £472 in fees were recorded. The total number of meters tested and examined by the Department since its institution in 1861 amounts to 3,505,030—the fees received being £115,410. There are now eight district gas meter testing stations under the jurisdiction of the Magistrates (the Local Authority for the Administration of the Sale of Gas Acts). The profit on the year's work amounted to £1821.

Annual Report of the Danish Gas Company.—At the annual meeting of the Danish Gas Company, which will be held on Nov. 15, in Copenhagen, the Directors will report that the balance standing to the credit of the profit and loss account, after charging interest and pensions, is Kr. 660,040 83. Out of this sum they recommend that a dividend of 6 p.ct. on the ordinary shares be declared. This will leave Kr. 319,840 83 to carry forward. All the debenture stock and preference shares of the Company have been redeemed by purchase during the past year. The works still owned by the Company show a profit on the working during the past year. This is due partly to the improvement in the rate of exchange, and partly to the very efficient working. The quantity of gas sold was 307,860,000 c.ft., against 312,152,000 c.ft. in the previous year, being a decrease of 1·37 p.ct. There has been a further capital expenditure of Kr. 211,245 59 for additional plant, mains, &c., during the past year. All extension work and repairs have been completed, and the works are prepared to meet the demands of the coming winter. The Directors have, through the Danish Government, claimed compensation for the remaining part of the Company's claim in connection with the Flensburg Gas-Works. The valuers have not yet made their award in respect of the Frederiksberg over-valuation; but it is hoped that it will be ready by the end of this month. Until this over-valuation has been considered, it is impossible to say whether it will be necessary to carry the matter further before a settlement is arrived at.

New Plant for Bangor.—On the recommendation of the Manager, Mr. B. Mitchell, the Bangor (Co. Down) Urban Council have unanimously decided to accept the tender of West's Gas Improvement Company for the enlargement of the gas-works; the amount of their quotation being £17,307.

Gas Lecture at Brighouse.—Last week, Mr. T. R. Mortimer, Assistant Gas Engineer to the Brighouse Corporation, lectured before the members of the Brighouse Engineering Society on "The Manufacture of Gas." There was a good attendance, and the lecture was followed with close interest.

Gas Company's Coal Stolen.—Edward Winyard and Edwin George Gibbons were charged at the Greenwich Police Court with being concerned together in stealing and receiving from a sailing barge lying off East Greenwich 12½ cwt. of coal, value £3, the property of the South Metropolitan Gas Company. Both pleaded guilty. It was stated that defendants should have put the coal ashore with the balance of a load they had delivered. They were leaving the docks with a load of timber, and a Port of London Authority's searcher found the coal concealed in the cabin. A representative of defendants' employers said the offence would not be overlooked, though both bore good characters. The Magistrate bound them over to come up for judgment if called upon.

Collins' Engineers' Diary.—Messrs. William Collins, Sons, & Co., Ltd., have published an "Engineers' Diary." They have brought the leading aspects of engineering under review, and have provided a dependable guide on all points of vital interest to engineers, well arranged for quick reference. All the information given in the Diary, including facts, formulæ, and tables, has been prepared by experts, reviewed by practical engineers, and approved by the professor of engineering at one of the largest technical colleges in the country. By using india paper, the publishers have been successful in producing a wealth of information in compact form. The prices vary from 2s. to 7s., according to the type of binding. A real pigskin binding, for example, costs 3s. 6d.

Heavy Demand for Gas Fires at Plymouth.—Inquiries made last week by our Plymouth Correspondent elicited that there was an extraordinary demand for gas fires. Mr. J. H. Ellis, Chairman of the Plymouth Gas Company, stated that the prospects that sufficient coal to keep open fires going during the winter would not be available had led to a remarkable rush to the Gas Company. On one day, Monday, Oct. 18, no fewer than 51 gas fires were sent out from the Company's stores; and it was anticipated that this demand would continue for some time. There was a net increase of 263 gas fires supplied during the past month, as compared with the corresponding period of 1925. Mr. Ellis added that, once such fires were introduced into houses, they were likely to remain there. The same story was told by Mr. Bradshaw, Manager of the Plymouth Corporation's Devonport Gas-Works, who stated that the coal stoppage had resulted in a greatly increased demand for gas appliances of all kinds. His department had supplied 380 more cookers and 210 more fires during the September quarter than they did in the corresponding quarter of last year.

The Aberdeen Gas Committee have decided that no increase shall be made at present in the price of gas, which is 2s. 6d. per 1000 c.ft.

The Bradford Corporation Gas Committee have agreed to participate in a scheme for the sale to tar distillers of surplus tar produced by various gas undertakings in Yorkshire, subject to the agreement being limited to a period of five years.

The liquidator of the gas-works at Rathfriland, Co. Down, announces a realization sale of all the gasmaking appliances, Crossley engine, gas stoves, &c., of the Company. The appliances include two new and unused retorts, purifier, condenser, gasholder, tar tank, &c.

The Directors of the Montevideo Gas and Dry Dock Company, Ltd., have declared an interim dividend on the ordinary stock for the half-year ended June 30 last, of 2½ p.ct. (actual), free of income-tax, payable on Dec. 1. This compares with 2 p.ct., free of tax, for the corresponding period of 1925.

At a meeting of the Blackpool Gas Committee on Oct. 14, it was stated that up to date the coal dispute had cost the department £23,600. The present increase in price, which has brought the charge to 3s. 1½d. per 1000 c.ft., has only raised the revenue by £13,500; and the question of a further increase will have to be considered.

At the Stirling Burgh Police Court last week, the Stirling Gas Light Company sued John Kidd, a baker, for stealing gas to the value of 13s. 3d. In Kidd's house there was a shilling meter, and when opened by the Company's official it was found to contain 13 halfpennies, which had been filed down to the size of shillings. Judge Ferguson imposed a fine of £2, with the alternative of 20 days' imprisonment.

The Budleigh Salterton Urban Council have decided, in view of the fact that the local Gas Company decline a revision of the maximum price being dealt with in the Special Order which they are applying for, to apply to the Board of Trade under the provisions of section 1 of the Gas Regulation Act for a reduction of such price. The Clerk has been directed to attend the public inquiry which may be ordered by the Board of Trade.

William Brokenshire was working on a trench for the Liskeard Gas Company, Ltd., when he was knocked down by a motor-car, succumbing to his injuries a week later. In the Local County Court application was made under the Workmen's Compensation Act by his sole dependant, his 15-year old son. The Company denied liability, claiming that deceased was not in regular work; but to avoid litigation, they had paid £75 into court for full settlement of all claims. His Honour Judge Gurdon found that the boy was the sole dependant, and awarded him £75, with costs up to the date of the payment into Court.

STOCK MARKET REPORT.

Two reasons are given for the dullness which pervaded the stock markets last week; the improvement in the value of the franc, and the possibility of an advance in the Bank Rate. With regard to the former, it is the impression that a determined effort is at last being made towards stabilization. The announcement on Thursday of "no change" in the Bank Rate was received with considerable relief. A good deal of apprehension of the monetary situation still remained, however, and in consequence, while there was little change in quotations, the tone in the gilt-edged market was generally dull. The 5 p.ct. War Loan was an exception, there being a considerable amount of buying at about 101⅜.

The variation in the results of the Corporation issues is surprising; and whereas the Sunderland 5 p.ct. loan at 99 was immediately over-subscribed, the Leicester issue at 99⅛ was not successful—the small variation of 10s. in the price of the issue resulting in success or failure.

In the Industrial Market, considerable interest was taken in the big chemical combine, and the values of the shares of the participating companies improved very much, especially the United Alkali shares. The magnitude of the combination will be realized by the amount of the issued capital, which, including preference and debenture capital, exceeds forty million pounds.

The Gas Market was uninteresting, and business continued to be on a small scale. There were several improvements in the quotations, the principal of which was a rise of 2 points in the Hornsey 3½ p.ct. stock to 69-71. There were improvements also in the Bournemouth, Croydon, European, Imperial Continental and Liverpool stocks, and the Primitiva ordinary shares. The Montevideo Company announce an interim dividend on the ordinary shares of 2½ p.ct., free of tax, for the half-year to June 30, as compared with 2 p.ct. for the corresponding period of 1925.

The following transactions were recorded during the week:

On Monday, Bombay 20s. 3d., Bournemouth 12½, Continental Union 27, 27½, 29, Gas Light and Coke 84⅝, 84⅞, 4 p.ct. preference 75¼, 3 p.ct. debenture 59⅜, Imperial Continental 129½, Liverpool 7 p.ct. preference 101, Primitiva 12s. 3d., 12s. 6d. Supplementary prices, Brighton and Hove 5 p.ct. debenture 95⅝, Gas Light and Coke 5 p.ct. debenture (interest from July 8, 1926) 100⅝, 101.

On Tuesday, Alliance and Dublin 84, Bournemouth 5 p.ct. 12, Commercial 4 p.ct. 78, 78½, European 6⅝, 6⅞, 6⅝, 6⅝, Gas Light and Coke 84¼, 84⅜, 84⅜, 3½ p.ct. 59, Hornsey 3½ p.ct. 70, 70½, Imperial Continental 128, 129, 129½, Montevideo 81⅜, 82, Primitiva 12s. 3d., 12s. 4½d., 12s. 6d., South Metropolitan 91½, 91½, 92, 3 p.ct. debenture 58½, 6½ p.ct. debenture 100⅝, South Suburban 97½, 97⅞, 5 p.ct. debenture 94, Wandsworth 3½ p.ct. 102. Supplementary prices, Hong Kong and China 5 p.ct. debenture 80.

On Wednesday, Alliance and Dublin 83½, Bournemouth 5 p.ct. 12, British 104, Commercial 3 p.ct. debenture 56½, Croydon maximum dividend 80, 80½, Gas Light and Coke 84, 84¼, 84⅛, 84⅜, 3½ p.ct. 59½, 4 p.ct. preference 75½, 3 p.ct. debenture 58½, Imperial Continental 129½, Primitiva 12s. 3d., 12s. 4½d., 12s. 6d., 12s. 7½d., 12s. 8¼d., South Metropolitan 91½, 92, 92½, 92½, 92½, 6½ p.ct. debenture 102, Swansea 6½ p.ct. debenture 101, Wandsworth "B" 102½. Supplementary prices, Hornsey 5 p.ct. 90, 90½, Southend 5 p.ct. new "B" 81, 81½.

On Thursday, Alliance and Dublin 84, Bombay 20s. 3d., 20s. 9d., Croydon 97, 98, European 6⅛, Gas Light and Coke 84, 84⅛, 84⅜, 3½ p.ct. maximum 59½, 59⅜, 4 p.ct. preference 75, 75½, Imperial Continental 129½, 130½, Primitiva 12s. 3d., 12s. 4½d., 12s. 7½d., South Metropolitan 91½, 91⅝, 92, 6½ p.ct. debenture 102, Wandsworth "A" 122, 123, "B" 102, 102½, 3 p.ct. debenture 54½. Supplementary prices, Swansea 5 p.ct. maximum 78½, Wandsworth 3½ p.ct. new 88, 88½, 4 p.ct. debenture 73½, York 67.

On Friday, Bournemouth "B" 12½, Commercial 4 p.ct. 77½, 78, 3 p.ct. debenture 56½, Gas Light and Coke 84, 84⅛, 84⅜, 84⅜, 85, 4 p.ct. preference 75½, 76⅜, 3 p.ct. debenture 58½, 6 p.ct. Brentford debenture 104, Hastings and St. Leonards 5 p.ct. converted 89, 3½ p.ct. converted 69, Imperial Continental 129⅜, 130½, Primitiva 12s. 3d., 12s. 6d., 12s. 6¾d., 12s. 7½d., 4 p.ct. 1st debentures 85, South Metropolitan 91⅜, 91⅝, 92½.

In the Money Market, the usual close of the week easier conditions prevailed, and credits were offered at 3½ p.ct. and occasionally at slightly lower rates. Treasury Bills, as was expected, were allotted at still higher rates, the average being £4 16s. 11·12d., or 7⅞d. p.ct. above the previous week's rate.

The leading Foreign exchanges were uneven, but all moved against this country. The French exchange closed at 160½, Belgian francs finished at 172, and the Milan rate at 111½. Sterling on New York declined to 4.84⅜⅞. At one time the quotation was 4.84⅞—the lowest rate since January last.

Silver shows signs of improvement, but the price is still low at 24⅜d. per oz. No Gold was available, the price remaining at 84s. 11½d. per oz.

The Bank Rate is 5 p.ct., to which it was raised from 4 p.ct. on Dec. 3. Bankers' deposit rates are 3 p.ct. The deposit rates of the discount houses are 3 p.ct. at call and 3¼ p.ct. at notice.

Issue.	Share.	When ex-Dividend.	Dividends. Prev. Hf.Yr	Dividends. Last Hf. Yr.	NAME.	Quotations. Oct. 22.	Rise or Fall on week.	Transactions Lowest and Highest Prices.
£			% p.a.	% p.a.				
171,978	Stk.	Aug. 12	5	5	Aldershot 5 p.c. max. C.	72—75	..	..
222,992	,,	,,	4	4	Do. 4 p.c. Pref.	65—70	..	..
1,551,868	,,	Sept. 30	6½	6½	Alliance & Dublin Ord.	83—88	..	83½—84
374,000	,,	July 8	4	4	Do. 4 p.c. Deb.	67—70	..	..
300,000	1	Oct. 14	1/7½	1/7½	Bombay, Ltd.	1—1¼*	..	20/3—20/9
170 000	10	Aug. 26	8½	8½	Bournemouth 5 p.c.	12—13	+½	12⅝—12⅝
500,050	10	,,	7	7	Do. B 7 p.c.	12—13	+½	12½
275,000	10	,,	6	6	Do. Pref. 6 p.c.	11—12	..	..
50.000	Stk.	June 24	3	3	Do. 3 p.c. Deb.	54—57	..	..
163.025	,,	,,	4	4	Do. 4 p.c. Deb.	74—77	..	..
214,740	,,	Aug. 26	12	12	Brighton & Hove Orig.	163—168	..	..
244,250	,,	,,	9	9	Do. A Ord.	125—130	..	..
1,387,500	,,	July 22	5	5	Bristol 5 p.c. max.	86½—87½a	..	..
855,000	,,	Sept. 30	7	8	British Ord.	102—107	..	..
100,000	,,	June 24	7	7	Do. 7 p.c. Pref.	114—119	..	104
120.000	,,	,,	4	4	Do. 4 p.c. Red. Deb.	68—73	..	..
100,000	10	June 10	6	8	Cape Town, Ltd.	7—8	..	..
100.000	10	Apl. 22	4½	4½	Do. 4½ p.c. Pref.	6—7	..	..
150,000	Stk.	June 24	4½	4½	Do. 4½ p.c. Deb.	68—73	..	..
626,860	,,	July 22	6	6	Cardiff Con. Ord.	94—97	..	..
237,860	,,	June 24	7½	7½	Do. 7½ p.c. Red. Deb.	99—102	..	..
157,150	,,	Aug. 12	6½	5	Chester 5 p.c. Ord.	88—93b	..	..
79.185	1	Sept. 30	+2/-	+2/-	Colombo Ltd. Ord.	27/—29/-	..	..
24.495	1	,,	1/4½	1/4½	Do. 7 p.c. Pref.	20/—22/-	..	..
1,513,280	Stk.	Aug. 12	5½	5½	Commercial 4 p.c. Cap.	77—80	..	..
560,000	,,	,,	5/3/4	5/3/4	Do. 3½ p.c. Cap.	74—77	..	77½—78½
475.000	,,	June 24	3	3	Do 3 p.c. Deb.	55—58	..	..
800.000	,,	Sept. 30	§2	§1	Continental Union, Ltd.	26—31	—1	56½
200.000	,,	,,	7	7	Do. 7 p.c. Pref.	82—86	..	27—29
737.150	,,	Aug. 12	6½	6½	roydon sliding scale	96—99	+1	..
403,100	,,	,,	5	5	Do. max. div.	78—81	..	97—98
492,270	,,	Aug. 26	9	6	Derby Con.	107—109e	..	80—80½
55,000	,,	June 24	4	4	Do. Deb.	73—75e	..	..
209,000	,,	Sept. 16	5	5	East Hull Ord. 5 p.c.	84—87	..	..
50.000	,,	June 24	5	5	Eastbourne 5 p.c. Deb.	91—96	..	..
1,002,180	10	Sept. 30	†4	†3	European, Ltd.	6⅞—7⅛	+⅛	6⅞—6⅞
18,788 960	Stk.	Aug. 12	4/17/4	5/1/4	Gas Light & Coke 4 p.c. Ord.	83½—85½	..	84—85
2,500,000	,,	,,	3½	3½	Do. 3½ p.c. max.	58—61	..	59⅜ 59⅝
4,157 020	,,	,,	4	4	Do. 4 p.c. Con. Pref.	74—77	..	76—76½
5,002,630	,,	June 24	3	3	Do. 3 p.c. Con. Deb.	58—61	..	58½—59⅛
181,315	,,	,,	—	—	Do. 6 p.c. Br'sf'd Rd. Db.	100—105	..	104
130,000	,,	—	10	10	Do. 10 p.c. Bonds.	..	..	..
42.000	,,	—	7½	7½	Do. 7½ p.c. Ilford Deb.	..	..	..
82,500	,,	Aug. 26	6½	6½	Hastings & St L. 5 p.c. Conv	87—92	..	..
258,740	,,	,,	5½	5½	Do. 3½ p.c. Conv.	66—71	..	89
70.000	10	Oct. 14	†10	†10	Hongkong & China, Ltd.	19—20*	..	69
173,300	Stk.	Sept. 16	5	5	Hornsey Con. 3½ p.c.	69—71	+2	..
1,976,000	,,	May 20	10	†10	Imperial Continental Cap.	127—132	+1	70—70½
226,170	,,	Aug. 12	3½	3½	Do. 3½ p.c. Red. Deb.	68—71	..	128—130½
235,342	,,	Aug. 12	6½	6½	Lea Bridge 5 p.c. Ord.	92—97	..	..
2,127,340	,,	Aug. 12	5½	5½	Liverpool 5 p.c. Ord.	78½—79½b	+½	..
600,000	,,	Sept. 30	7	7	Do. 7 p.c. Red. Pref.	102—105b	+2½	..
165,736	,,	Aug. 26	9	8	Maidstone 5 p.c. Cap.	112—117	..	..
63,480	,,	June 24	3	3	Do. 3 p.c. Deb.	53—58	..	..
75,000	5	June 24	†6	†7	Malta & Mediterranean	5½—5⅝	..	..
541,920	Stk.	May 20	†4	†6	Montevideo, Ltd.	80—85	..	81½—82
2,061,315	,,	Aug. 12	5	5	Newcastle & Gateshead Con.	70½—71½d	—½	..
360.929	,,	,,	4	4	Do. 4 p.c. Pref.	78—74d	..	..
529,705	,,	June 24	3½	3½	Do. 3½ p.c. Deb.	68½—69d	..	..
15,000	,,	Aug. 26	11½	11½	North Middlesex 10 p.c.	151—156	..	..
91,580	,,	,,	8⅛	8⅛	Do. 7 p.c.	109—114	..	..
800,000	,,	May 6	9	7	Oriental, Ltd.	97—102	..	..
188,120	,,	June 24	7⅞	7⅞	Plym'th & Ston'house 5 p.c.	108—113	..	..
414,500	,,	Aug. 26	—	7/4/0	Portsm'th Con. Stk. 4 p.c. Std.	102—107	..	..
236,782	,,	,,	—	5/0/0	Do. 5 p.c. max.	78—81	..	..
2,389,909	1	,,	—	—	Primitiva Ord.	12/—13/-	+/8	12/3—12/8½
282,200	100	June 1	4	4	Do. 4 p.c. Red. Deb.	83—85	..	85
600,000	Stk.	July 22	4	4	Do. 4 p.c. Red. Deb. 1911	69—71	..	..
180,305	,,	June 24	4	4	Do. B. Aires 4 p.c. Rd. Db.	69—71	..	..
256,847	,,	,,	4	4	Do. R'r P'te 4 p.c. Rd. Db.	69—71	..	..
150,000	10	Sept. 30	6	6	San Paulo 6 p.c. Pref.	7½—8	..	..
125,000	50	July 1	5	5	Do. 5 p.c. Red. Deb.	46—49	..	..
270,000	Stk.	Sept. 16	6	5⅜	Sheffield A	97—99e	—1	..
419,968	,,	,,	6	5⅜	Do. B	97—99e	—1	..
1,047.000	,,	,,	6	5⅜	Do. C	97—99e	—1	..
90,000	10	June 11	4	—	South African	5—7	..	..
6,609,895	Stk.	Aug. 12	7	5	South Met. Ord.	90½—92½	..	91½—92½
1,895,445	,,	July 8	3	3	Do. 3 p.c. Deb.	57—60	..	58½
734,000	,,	Sept. 16	6½	6½	Do. 6½ p.c. Red. Db.	100—102	..	100⅜—102
91,500	,,	Aug. 12	8½	8½	South Shields Con.	114—116d	..	..
1,187,795	,,	Aug. 12	6½	6½	South Suburban Ord. 5 p.c.	96—99	..	97⅛—97⅝
368,837	,,	June 24	5	5	Do. 5 p.c. Deb.	92—95	..	94
647,740	,,	Oct. 14	5	5	South'mpton Ord. 5 p.c. max.	75—78*	..	..
121,275	,,	June 24	4	4	Do. 4 p.c. Deb.	68—73	..	..
350,000	,,	Aug. 26	7	7	Swansea 7 p.c. Red. Pref.	100—102	..	..
200,000	,,	June 24	6½	6½	Do. 6½ p.c. Red. Deb.	100—102	..	101
120,000	,,	July 22	7⅜	7⅜	Tottenham District A 5 p.c.	105—110	..	..
882.275	,,	,,	6½	6½	Do. B 8½ p.c.	88—91	..	..
150,000	,,	,,	5½	5½	Do. 5½ p.c. Pref.	99—101	..	..
181,255	,,	June 10	4	4	Do. 4 p.c. Deb.	73—76	..	..
258,251	,,	Aug. 26	5	5	Tynemouth Con. and New	67—68d	+1	..
197,294	,,	Aug. 26	6⅝	6⅝	Uxbridge, Maidenhead, & Wycombe 5 p.c.	85—90	..	..
88,830	,,	,,	5	5	Do. 5 p.c. pref.	80—85	..	..
91,800	,,	,,	6⅝	6⅝	Do. 5 p.c. Maidenh'd	85—90	..	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	,,	July 8	8½	8½	Wandsworth A 5 p.c.	122—127	..	122—123
255,636	,,	,,	7	7	Do. B 8½ p.c.	102—107	..	102—102½
412,450	,,	,,	5/19/0	5/19/0	Do. C and New	88—93	..	88—88½
852,000	,,	,,	6⅝	6⅝	Wimbledon 5 p.c.	98—103	..	..
98,000	,,	,,	7½	7½	Epsom 5 p.c.	104—109	..	..
88,416	,,	June 24	3	3	3 p.c. Deb.	54—57	..	54½

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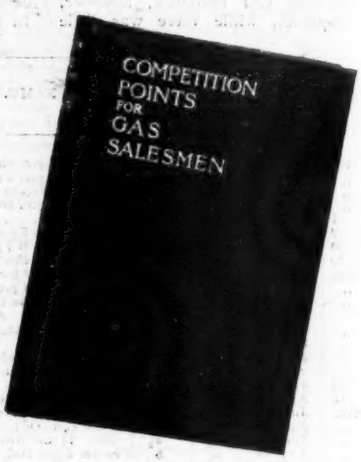

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